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CONTENTS.	PAGE.
POINTS FOR PRODUCERS	514-519
INQUIRY DEPARTMENT.. .. .	520-525
REPORT ON THIRD YEAR OF OPERATIONS OF THE RIVER MURRAY HERD TESTING ASSOCIATION	526-539
DOWNY MILDEW	540-550
NARACOORTE AND KYRIOLITE BRANCHES OF THE AGRICULTURAL BUREAU--	
EIGHTH ANNUAL FARM COMPETITIONS	551-562
MOUNT GAMBER AND DISTRICT HERD TESTING ASSOCIATION	562-563
GLENLOE HERD TESTING ASSOCIATION	564
RIVER MURRAY HERD TESTING ASSOCIATION	565
TANK-ALL INVESTIGATIONS	566-570
THE AGRICULTURAL OUTLOOK	570
DAIRY AND FARM PRODUCE MARKETS	571
ANALYSES OF SAMPLES OF FERTILIZERS	572
ADVISORY BOARD OF AGRICULTURE	573-578
ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR JANUARY, 1924	579
RAINFALL	581-582
AGRICULTURAL BUREAU REPORTS	583-624

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JOHN COWAN,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Crop Competitions at Miltalie.

Recognising the possibilities for good that were likely to result from wheat-growing competitions in South Australia, the Government recently, on the recommendation of the Advisory Board of Agriculture, decided to subsidise competitions of this nature conducted under the auspices of Branches of the Agricultural Bureau. The first grant under these provisions has now been made to the Miltalie Branch. The competitions conducted by this Branch of the Bureau were open to wheatgrowers in the district council of Franklin Harbor. The minimum area of any entry was 100 acres, and the number of varieties that could be submitted in one entry was limited to three. Fourteen entries were received. Messrs. Arthur Venning and S. A. Wilson, both of Cowell, acted as judges. The following awards were made:—First, Mr. P. C. Wake, Elbow Hill, whose entry consisted of Ghyaas and Currawa varieties; second prize, Mr. J. S. Jacobs, Miltalie (Currawa, Warren, and Major varieties); third prize, Mr. J. P. Story, Miltalie (Currawa, Bluey, and Major varieties). Mr. A. S. Brown acted as Hon. Secretary to the competitions.

Woolly Aphis.

The application of salt to the soil surrounding apple trees has been recommended as a means of controlling the woolly aphis, and with a view to testing the usefulness of this procedure, the Horticultural Instructor (Mr. George Quim) recently instituted a series of tests at the Blackwood Experimental Orchard. Whilst it is too early yet to draw any definite conclusions as to the value of the practice, up till the present no effect is noticeable. During the past few weeks the pest has also been subjected to treatment with Black Leaf 40, a motor pump and spray pistol being used for the purpose of distributing the spray. Commenting on this, the Manager of the Orchard (Mr. R. Fowler) stated that the spray pistol was the most effective weapon he had ever used against woolly aphis. "The ease with which it can be manipulated and the force with which the spray can be concentrated on any particular spot makes it an invaluable weapon in the fight with woolly aphis," he continued. "The difficulty has always been effectively to get at the insects, owing to their natural protection; but the spray pistol has overcome that difficulty."

Thin Cream.

After having paid a visit to the Strathalbyn Butter Factory last month, the Assistant Dairy Expert (Mr. H. J. Apps) expressed the opinion that many suppliers were delivering too great a percentage of thin cream, which was resulting in too high acidity. Mr. Apps suggested that these producers should so alter the cream screws of their separators as to produce cream testing about 45 per cent. of butter fat.

He suggested, also, that producers might well make a practice of stirring the cream several times during each day. Mr. Apps further mentioned that the delivery of thin cream was not confined to suppliers in the Strathalbyn district, but at this time of the year, unfortunately, it appeared to be a general practice.

Pasture Plants at Mount Remarkable.

At the suggestion of the Department of Agriculture, one of the soldier settlers on the Mount Remarkable Estate, Mr. Roy Treglown, tried on his hills block a number of different pasture plants. Last week Mr. Treglown forwarded some specimens of these plants to the Department of Agriculture for the purpose of showing the growth made by Wimmera rye grass, Subterranean clover, and lucerne. The rye grass was over 1ft. in height, which, for the first season's growth, must be considered very satisfactory. The Subterranean clover had made plants 5ft. in diameter, and another satisfactory feature was that it had seeded extremely well. Amongst the plants forwarded were specimens of cluster and hop clovers, which had made very strong growth on land that had been dressed with superphosphate.

Director of Agriculture at Berri.

During last month the Director of Agriculture (Professor Arthur J. Perkins), accompanied by the Horticultural Instructor (Mr. George Quinn), paid a visit to Berri. On his return to Adelaide, the Director stated that he had never seen the Experimental Orchard at Berri in better condition, nor had he seen the trees making better growth. "The growth of the trees is magnificent," he remarked. "The fruiting of the currants and sultanas is exceptionally good. The muscatels, on the other hand, appear to be rather defective, owing, apparently, to low temperature conditions and cold winds at the time the vines were in bloom, as a result of which they are setting irregularly. The drainage scheme on the Experimental Orchard, which we particularly went to inspect, is working effectively. The trees on the edge of the salt patch, which were dying back, appear to be recovering, and there is every reason to believe that next autumn we shall succeed in raising a cover crop on the barren salt patch. The only difficulty that we appear to be faced with is that of leaching the ground rapidly and effectively on a rather steep incline. We are also taking into consideration the drainage of a flat tract of land, adjoining the river, which is gradually becoming salt laden as a result of drainage from irrigations of adjoining hill slopes. We propose to prepare a scheme to deal with this matter, and hope to make a start on the work during the current season. This piece of drainage should prove very useful to the settlement, because there are many other blocks at Berri that are affected in a similar manner." In the evening the Director and Mr. Quinn attended a meeting of the local Branch of the Agricultural Bureau and addressed the members on various points raised.

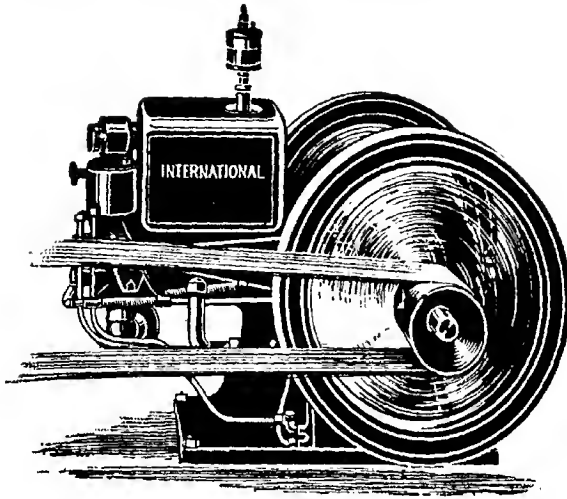
A Record Wheat Yield.

A yield of 110 bushels to the acre, on unirrigated ground said by the University of California, to be "the largest recorded yield of wheat available from all sources in North America" has been reached on the University Farm at Davis. The variety was Onas, which was originated by a South Australian wheat breeder and grower—Mr. F. Coleman of Saddleworth. Information recently received by the South Australian Department of Agriculture reveals that the seed of this variety was obtained by the United States Department from a single head of wheat sent in a letter from Australia. The seed from this head was increased until a sufficient amount of seed was grown to sow about 10 acres, in the fall of 1922, on the University Farm at Davis, California. The land was not fertilised in any way, and has not been. "No doubt this rest, and the lightness of the preceding crops had much to do with the very high yield of 110 bushels per acre," says the Assistant Professor of Agronomy in charge of cereal investigations. "The wheat was harvested by means of a small John Deering Combined Harvester, about the middle of June. The yield per acre of a 1/5 acre plot, selected, was 110 bushels per acre. For the whole field (10 acres), the yield was about 85 bushels. "The milling tests of Onas wheat at our sub-station at Kearney Park, in Fresno county, showed it to be very poor, while the tests from the Onas wheat at Davis were much better, although not equal to our best wheats. In the rod-row 1/50 acre replicated plots at Davis Onas stood number five, but in the rod-row plots at Kearney, it stood number one in yield."

Harvesting the Pea Crop.

For many years, the officers of the Department of Agriculture including the Director of Agriculture (Professor Arthur J. Perkins), the Superintendent of Experimental Work (Mr. W. J. Spafford), and the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch), have urged on landholders in the cereal growing districts of the State the necessity for growing leguminous crops in rotation with cereals. The experience of all countries producing crops has proved this practice to be the only practicable method of maintaining the fertility of the soil. In South Australia, peas can be grown satisfactorily in a majority of the districts in which the cereals are produced; and the chief reason that the area under this crop has been restricted, is the difficulty experienced up till the present in harvesting the grain. The need has been for a machine capable of directly harvesting the peas, and to take the place of the existing cumbersome method of cutting with a scythe or mowing with the grass cutter, cocking, transporting to a threshing ground and then rolling, or tramping with livestock.

Of course, some of the more advanced growers have gone to the extent of installing power threshers, stacking their peas and passing them through the thresher as opportunity offers, but even with this additional equipment the cost and difficulty of the operations are such



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as to militate against an increase in the area under peas, and in the number of farmers who would undertake to grow the crop. Recent improvements in harvesting machinery, however, suggest that these difficulties have now been overcome. On Thursday last, the Superintendent of Experimental Work (Mr. W. J. Spafford), and the Secretary of the Advisory Board of Agriculture (Mr. Harold J. Finnis), had an opportunity of inspecting a crop of peas that was being harvested on the farm of Mr. W. H. Jared at Port Noarlunga. A paddock of about 45 acres was carrying a good crop of Early Dunn peas, and this was being taken off by a McKay Sunlight header with a pea harvester attached. A count of the bags revealed the fact that the part of the crop that had been harvested was yielding from 10 bags to 12 bags to the acre. It was estimated by the manager of the farm, (Mr. Pike), that the quantity left on the ground was less than one-quarter bushel to the acre, and there was so little to be seen that this estimate can be regarded as quite a safe one.

The nature of the sample can be judged from the fact that the grain was being sold direct from the field after the bags had been sewn, as taken from the machine. Despite the fact that the crop showed some evidence of having been attacked by caterpillars, there was a very small proportion of cracked grain. Provision has been made on the machine by the manufacturer to separate this cracked grain from the sample, but the hopper provided for the purpose had little to do.

There is every reason to anticipate that the perfecting of a machine for directly harvesting peas will have an immediate effect on the cropping practices of many of the cereal growing areas of the State. Directly landholders realise that the pea crop can be produced without that time involving and costly hand work that has been for so long inseparable from harvesting, there should be an extension in the area sown. The advantages associated with the crop have been recognised for years, and now that the mechanical difficulties of harvesting it apparently have been satisfactorily overcome, the pea crop should take its place in the crop rotation of the cereal growers.

Take-all.

The investigations being conducted in the laboratory of Plant Pathology at the University, which is working in conjunction with the Department of Agriculture with the object of throwing additional light on the take-all disease of wheat, are being watched with considerable interest by wheat growers. Crops in many portions of the State are reported to have suffered very badly from this disease during the season just closed. In order to secure definite data as to the extent of the damage done, the Lecturer in Plant Pathology at the University (Mr. G. Samuel, B.Sc.), is seeking the co-operation of the farmers. He is asking wheatgrowers to supply him with replies to the following questions:—(1). Which varieties of your wheat were affected with take-all? (2). Which were affected worse? (3). Which varieties

your wheat were not affected with take-all? (4). What is the history of the land for the last three years of the most badly affected crop? Mention burning, early or late fallow, dry or wet worked, &c. (5). What is the history of the land for the last three years of your best crop? (6). What are the chief grasses in your pasture? (7). Did take-all affect the wheat early and make bare patches in the crop, or did it attack it later forming patches with grainless ears (whitehead taze)? (8). Has take-all been worse with you this year; if so, do you think it has any connection with the wet season? (9). Can you estimate the number of bushels loss from take-all in your crop this year? From the point of view of the State, as well as that of the individual, these investigations should prove of the utmost importance, and readers will be doing a public service by supplying the information sought in this questionnaire.

Flies.

From time to time the Department of Agriculture receives from farmers and others in rural districts requests for information as to the methods of controlling flies. A point that is frequently overlooked by those who are troubled with this pest is that there is little likelihood of effectively overcoming it simply by attempting to poison the flies that are already hatched. The treatment of breeding places, the manure heap in particular, is of the utmost importance. Investigations carried out by the United States Department of Agriculture suggest that the best method of destroying the larvae in manure is to treat the heaps with borax at the rate of one pound to every 16 cubic yards of manure. In the tests conducted it was found that the best results were secured when the borax was applied in solution, or when water was sprinkled on after the borax had been scattered evenly over the refuse. It was found that borax was not only effective in killing the larvae, but when it came in contact with the eggs, it exerted a toxic action which prevented their hatching. A bait for the house fly said to have proved very effective, consists of a crust of bread sprinkled with sugar, and placed in a saucer containing 15 parts of water, or water and milk in equal parts, and one part of formalin. Another treatment that has been recommended is the following:—Make a solution of two parts of arsenate of soda, four parts of white sugar, and 40 parts of water. Into this solution place a stout unglazed paper. After it has soaked, the paper should be removed and dried. When required for use it should be dampened in water, and placed in a saucer.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

Hon. Secretary, Manmanarie Agricultural Bureau, asks—(1) Reason for death of ewes in lamb, two or three hours after being shifted from one paddock to another; the stomach swells and the sheep froth at the mouth. (2) Horse, after being released from work, rubs itself close to the sheath on a post.

Replies—(1) *Re ewes in lamb dying*: The deaths have been due to "bloating," which may easily be caused by a sudden change of pasture as from one paddock to another, particularly if the sheep are allowed to gorge themselves on fresh fodder. If carefully handled at the time of making the change, these bad effects can be mostly avoided. The sheep should only be allowed to take a limited quantity into their stomachs at a time, and then be held for a period of half an hour or so from grazing before they are allowed to go on feeding again. Handling them in this way until they get accustomed to the change will avoid the trouble you have had. This trouble appears more readily in pregnant ewes than in empty ones—only on account of the general physiological upset which occurs in all female animals concurrent with and dependent on the pregnant state. The provision of a good coarse salt and soda-bicarb. lick for sheep will serve as a worth-while preventive against bloating, and to treat affected animals take one teaspoonful each of bicarb. of soda and ground ginger, dissolve in half-pint of warm water, and give as a drench. If given early, this is usually an effective remedy. (2) *Re horse rubbing over post*. I presume that the spot he rests and rubs is on the abdomen, just in front of the anterior end of the sheath, or thereabouts. If my premise is correct, his action is indicative of infection with bots.

"J. C.," Tantanoola, asks reason for excessive scouring of stock when fed on ensilage.

Reply—Scouring is attributable in a general way to dietetic errors, which embrace (1) the quality of the feed, and (2) the general management of the feeding of it. Of the two above stated general causes, the former probably will contain the exact cause. It may very likely be that in the preparation of the ensilage, when the fodder is being packed into the silos, there are small pockets in it from which the air has not been properly excluded, and the result would be that decay of the vegetable fibres would be set up in them. When the ensilage was subsequently fed to the cattle, those of them which got these decayed portions in their ration would suffer the disability you mention, while the others of the mob which got only sweet, wholesome portions of their ration, would escape the trouble.

Hon. Secretary, Big Swamp Agricultural Bureau, reports cow, first milk, gave milk tinged with blood.

Reply—The blood in the milk may be due to injury to the udder, or it may be due to over-rich feeding, or to some irritant plant taken in with the food in the paddock. If there is any bruising or injury, you must treat it. If there is no apparent injury to cause the condition, I would suggest you give a purgative.

20 lb. (Epsom salts 1lb., ginger 2 tablespoonfuls). Reduce her feed somewhat and try a change of pasture if possible. Keep udder and teats thoroughly clean, and milk her out carefully and gently.

Hon. Secretary, Blackheath Agricultural Bureau, asks method of dehorning cattle, and at what age the operation should be performed?

Reply—There is a very suitable and serviceable dehorning instrument on the market; but, failing this, the horns may also be divided by a clean, sharp, crosscut or tenon saw, and the stumps dressed with melted tar and bound by tow and string; or, if haemorrhage is severe, treated with a hot iron. Though this operation is a severe one, if properly done, no serious trouble follows; but if done in the summer time, care must be taken to see that the wounds do not become fly-bitten, or the maggots that result therefrom may penetrate into the sinuses of the head. The operation is usually left until the horns are well grown.

“R. A. W.,” Coonahlook, has number of young sheep affected with blindness.

Reply—Place the affected sheep, if possible, in a shady situation. Bathe their eyes with a warm solution of boracic acid in water, so as to remove all discharge. Then drop into the affected eyes, so that it runs over all the eyeballs, a few drops of the following lotion:—Sulphate of zinc, 2 teaspoonfuls; boracic acid, 1 teaspoonful; distilled water, 1 pint. This treatment must be repeated two or three times daily until the eyes recover.

“F. A. S.,” Lyndoch, reports cow with sore teats. An advertised preparation was applied, and after four days the cow was brought in with a limp udder. She gave a very small yield of milk, some of which was of a brown color. Subsequently the milk was lumpy and one of the teats is completely blocked.

Reply—You have set up in your cow's udder a serious condition, known as “mammitis,” and permanently diminished her value as a milker. You cannot do more than keep the teats and udder thoroughly clean by frequent use of hot water to foment them, and keeping your own hands scrupulously clean, massage the udder and strip it out completely every couple of hours, even though you only get a cupful at a time. Destroy this milk. Beyond this treatment, you must leave the rest to the natural resistance of the beast to effect recovery; but I doubt if you will ever find her of much economic value to you again as a milker. ♦

“H. J. G.,” Cradock, has pony, 12 years old, falls down in harness as though in a fit.

Reply—Your pony suffers from a condition known as “vertigo,” in common parlance it would be said that it faints. With respect to the cause of this condition, in many cases, disturbances of digestion exerts an important effect; in other cases it may arise from certain diseases of the brain, heart, and blood vessels; and quite often no cause at all can be determined. A horse once affected may be subject to further periodical attacks; in other cases it may never recur. The only palliative that can be suggested is to pay careful attention at all times to dieting and the administration periodically of a good cathartic dose of medicine (aloes) to keep the blood in as pure a condition as possible.

“A. A. J.,” Mount Bryan, has young heifer with very hard udder and lump under the belly.

Reply—Your heifer appears to be suffering from a congested condition of her udder, incidental to and consequent upon the calving and her coming into milk for the first time. Apply hot fomentations frequently, taking care to avoid subsequent chilling. When rubbing in oil, massage gently but thoroughly. Milk her out frequently, and at all times be thoroughly clean in everything. The condition should, with care, reduce in a week or so. The swelling along the belly is only oedema, and will disappear as the udder condition works off. You could with advantage give the heifer a good draught of Epsom salts 1lb., ginger 2ozs.

“J. K.,” Auburn, has pony gelding with swollen jaws and mouth, which later extended to the chest and belly. The sheath and stifle are also swollen.

Reply—Your pony evidently is out of sorts and requires a good tonic. If you are hand feeding him, damp his feed and put a couple of packets of Epsom salts in the feed night and morning for a few days. Get a dozen of the following powders made up:—Pulv. nux vomica, 1 dram; P. gentian root, 3 drams. Give him one of these powders night and morning, a quarter to half an hour before feeding. The easiest way to give these is to mix the powders in a spoonful of treacle or honey to make a stiff, sticky paste. Pick this up on the end of a

smooth, flat piece of stick, and opening his mouth and pulling tongue out with one hand, smear the stuff over back of tongue and on his back teeth, so the stuff sticks there and he has to lick it down.

"Mrs. E. N.," Seven Hills, reports cow, calved week ago, which has no appetite and breathes rapidly. Milk flow is considerably reduced.

Reply—Your cow may be suffering from a septic condition of the breeding bag, following on the calving, and due to retention of a small portion of the calf at birth. I recommend repeated douching of the passage with plenty of warm water in which a few crystals of Condy's have been dissolved, adding only enough to color the water a pink tinge. Repeat this douching at least twice daily until improvement takes place. Give the following medicine:—Nux vomica, 2 tablespoonfuls; powdered gentian root, 1 tablespoonful. Mix in a spoonful of treacle to form a sticky paste and place it on the cow's tongue and smear the teeth with a short piece of stick. Repeat the dose night and morning.

"G. K.," Mount Gambier, asks reason why cows fail to get in calf.

Reply—When cows fail to get in calf readily, it is due to some diseased condition of the sexual organs, and the condition of the pasture on which they are being fed has no bearing on the matter, nor will the administration of any medicine by the mouth be of any avail. Local treatment by douches, &c., applied to the passage and breeding bag are necessary to effect any good, and the most satisfactory treatment to use will depend on the cause, an examination of the genital organs of the cows should be made to try to discover the exact diseased condition. You could try the following:—Douch cows once daily with lukewarm solution of corrosive sublimate, strength 1 to 4,000. When the cows are first noticed to be "in season," douch instead with a lukewarm solution of sodium bicarbonate in water, and put them to the bull an hour later.

"R. H. R.," Clare, has mare with bruise just above hoof. Swelling has taken place, which now extends up the leg into the shoulder.

Reply—Your mare is suffering from blood poisoning in the leg that was injured some time ago. I would recommend you to give her a good dose of physic to "commence" with, and subsequently keep her on green feed, or, if such is not available, sloppy bran and chaff with a handful of Epsom salts in it night and morning. Immerse the leg daily in a bucket of hot water containing some antiseptic, so that the water covers the site of the injury. Keep the leg in this for half an hour at a time, and keep adding fresh hot water from time to time so as to keep the bath hot. In between times of soaking, keep the wound covered with an antiseptic pack. By this means you may arrest the progress of the blood poisoning and ultimately restore the leg to its normal condition.

Hon. Secretary, Mannanarie Agricultural Bureau, reports horse which has sheath on post or rail after being unharnessed.

Reply—The horse is probably suffering from irritation inside the sheath due to a dirty condition there, such as a collection of smegma (grease). Use some warm water and soap and clean out the inside of the sheath as thoroughly as possible. With gentle manipulation, it would be possible to seize the end of the penis in the hand inserted into the open end of the sheath and draw it out so as to facilitate cleaning.

Hon. Secretary Rapid Bay Agricultural Bureau, Second Valley, asks if the quarter of a cow's udder is affected with mammitis, would the milk in the milking quarters be fit for human consumption.

Reply—Yes, providing it was drawn free from contamination by milk from the affected quarter.

Hon. Secretary, Agricultural Bureau, Clarendon, reports—(1) Bull with swollen sheath, and (2) litter of pigs weak in the back, now being fed on clover pollard, and barley.

Reply—(1) *Re* bull with swollen sheath: The condition is probably due to collection of sebaceous material inside the sheath, setting up irritation, and consequent inflammation and swelling. Treatment consists in cleaning out the sheath thoroughly with mild injection of soapy warm water, and subsequently injecting the sheath daily with a mild, non-irritating solution (such as boracic acid solution in water) until inflammation and soreness subsides. If the opening at the end of the sheath is too small to permit of protrusion of penis, it would have to be enlarged sufficiently with a sharp, clean knife, an operation which can be

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readily performed and without danger, providing antiseptic precautions are taken. (2) *Re* young pigs: Your pigs would appear to me to have been inclined to be "ricketty," a condition which would come to them from their dam. Sows heavy in pig require good liberal feeding on rich quality food and have plenty of exercise, to enable her to produce and rear a strong, healthy litter, and it is likely that your management of her may have been somewhat lacking in this respect. The foodstuffs you are now giving the young pigs is all right, and, in fact, prevents very thing to combat any tendency to ricketts. That it is satisfactory is shown, too, in the results that the young pigs have improved after being fed on it.

"R. B.," Bool Lagoon, has two draught mares, lame in front leg. The feet are hot to the touch, and swollen where the hoof joins the hair of the leg.

Reply—Your horses appear to have suffered from an injury to the front of the foot, just by the coronet; most likely they may have pricked themselves with a thorn, or even a piece of barbed wire. Hot fomentos to the parts until the swelling disappears and discharge commences to form, and subsequently antiseptic washings of the wound till the discharge stops, should be all that is required. Examine the site of the wound carefully to see that there is no small stake (such as a thorn or splinter of wood) present, which would have to be removed before healing would take place.

"J. W. W.," Port Lincoln, reports blindness in sheep.

Reply—At this time of the year there is generally a good deal of this trouble prevalent amongst sheep, and many term the condition as "pink eye." The blindness is usually caused by dust and the pollen of seedling pasture grasses, which gets into the sheep's eyes, causing irritation and subsequent blindness. Flies will help to spread the complaint once it appears. The sheep should be kept, if possible, on short grass country, and to treat the affected ones bathe the eyes well in a lukewarm solution of boracic acid and water and fill them up with plain white powdered sugar, two or three dressings of which are usually effective in most cases. Another useful lotion is—Zinc sulphate 1 teaspoonful, honey 1 teaspoonful, distilled water $\frac{1}{2}$ pint: a few drops to be put in the eyes three or four times daily.

"C. W. D.," Keith, has cow, fortnight after calving had violent fit. Lost use of legs.

Reply—Your cow is suffering from eclampsia, arising out of calving. You should commence treatment by administering the following drench:—Epsom salts 1lb., ground ginger 4 tablespoonfuls, treacle or molasses 1lb., warm water 1 quart. Once you have got the bowels well opened with this, keep them on the slack side a bit by putting a handful of Epsom salts in damped feed night and morning for a week. Irrigate the back passage daily with fairly hot water in which two or three crystals of Condy's have been dissolved. Continue this douching for a week or longer if there is still any discharge.

REMOVING SALT FROM BRACKISH WATER.

"H. T.," asks:—"Will quicklime freshen brackish water, seeing that quicklime mixed with salty soil converts the salt into carbonate of soda?" The Director of Chemistry (Dr. Hargreaves) replies:—"It may be answered that quicklime will not convert salt (sodium chloride) into carbonate of soda either in the soil or in water, or anywhere else. I do not know of any type of brackish water in this State that would be improved for agricultural use by the addition of quicklime. Some waters which are brackish contain also high proportions of carbonate of lime, and these waters can be improved for technical purposes (washing, boiler use, &c.) by the correct addition of quicklime. Again, some brackish waters are improved for all purposes by the addition of quicklime in the proper proportion. Our brackish waters are, however, in practically all cases alkaline in reaction, and do not need quicklime. There is no method that will remove the salt from brackish water except distillation."

Elbow Hill Branch of the Agricultural Bureau asked whether it was advisable to sow seed wheat reaped from a crop affected with "flag smut," or black smut, also, whether a crop grown from affected seed would be likely to be affected next year.

The Director of Agriculture (Professor Arthur J. Perkins) replies:—"Seeing that the plants affected with "flag smut" die back early in the season, and long before seed has formed and matured on growing crops, there does not appear to be much likelihood of seed from a field more or less affected with black rust transmitting the disease by direct infection of the seed. Infection usually takes place through the soil. The fact, however, cannot be overlooked that the wind may possibly convey germs of the disease on to neighboring healthy plants. Should, however, this be the case, it is almost certain that effective pickling with bluestone will destroy any stray germs that may have attached themselves to the seed."

DEPTH OF PLOUGHING.

The Glossop Branch of the Agricultural Bureau sought the advice of the Superintendent of Experimental Work (Mr. W. J. Spafford) as to the depth to which orchards in that district should be ploughed.

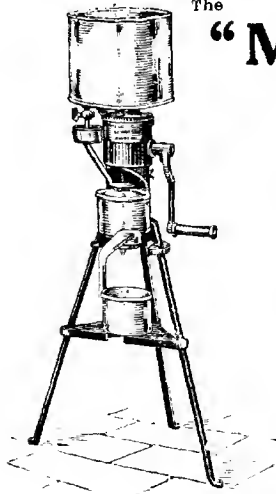
In reply, Mr. W. J. Spafford said:—"From every point of view, relatively deep ploughing will be advantageous in the Glossop district, and the first ploughing each winter of orchards and vineyards should be at least 10in. in depth. As a matter of fact, there is every probability of very marked benefit being secured from subsoiling these lands every few years; then the land would be ploughed 10in. in depth and subsoiled another 10in., making a total depth of 20in. of cultivated soil. With really deep cultivation, less water will be required for maximum returns, and the ever-present danger of the concentration of injurious salts at the surface will be reduced."

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REPORT ON THIRD YEAR OF OPERATIONS OF THE RIVER MURRAY HERD TESTING ASSOCIATION.

[By ARTHUR J. PERKINS, Director of Agriculture.]

The River Murray Herd Testing Association completed its third year of operations on the 30th of September, 1923. The present report, besides indicating results achieved during the year, covers a review of the three years during which the Association has been in existence.

THE 1922-23 COMBINED ASSOCIATION RESULTS.

The combined results of the Association in 1922-23 are shown below in Table I.:-

TABLE I.—*Showing Combined Results of River Murray Herd Testing Association for 1922-23 Season.*

Months.	Mean Cows.		Milk.			Butter Fat.	
	In Herds.	In Milk.	Association.	Per Cow.	Test.	Association.	Per Cow.
1922-23.			Lbs.	Lbs.	%	Lbs.	Lbs.
October	278-17	223-97	180,443	648-68	4-15	7,494-59	26-94
November	246-31	203-83	141,938-5	576-26	4-29	6,087-62	24-72
December	252-00	210-75	156,610	621-47	4-30	6,735-79	26-79
January	255-98	222-23	169,325	661-45	4-36	7,385-54	28-81
February	262-04	234-35	154,305-5	588-86	4-41	6,808-37	25-98
March	270-32	232-16	157,875	584-03	4-65	7,339-71	27-15
April	274-44	232-29	144,613-5	526-94	4-55	6,573-55	23-91
May	287-36	245-31	156,767-5	545-54	4-54	7,123-93	24-79
June	284-84	244-54	144,485	507-25	4-52	6,537-02	22-95
July	287-36	241-96	155,955-5	542-72	4-41	6,879-76	23-94
August	282-45	235-84	167,602-5	593-39	4-18	7,016-72	24-82
September	278-02	233-30	184,554	663-82	4-18	7,721-43	27-77
Means	271-61	230-04	—	7,048-68	4-37	—	26-16
Total production for year			1,914,475	—	—	183,698-03	

The River Murray Herd Testing Association is to be congratulated on these results, which, from the point of view of the combined herds are in reality more meritorious than would appear on the surface. It should be pointed out here that in the 1922-23 season the Association lost their leading herd, which by its fine performances contributed much to the successes of the preceding two seasons. How much Mr. Halliday's herd counted in this connection will be made clear by the following facts:—

In 1920-21 Mr. Halliday's herd represented 15.1 per cent. of the cows of the Association, and produced 20.7 per cent. of the milk of

total number in the Association, and they were responsible for 23.4 per cent. of the total milk production.

Hence, in the absence of Mr. Halliday's herd, the mean milk production per cow in the Association would have been 640.05galls., instead of 685.32galls. in 1920-21, and 646.67galls. instead of 690.95galls. in 1921-22.

Similarly, had Mr. Halliday's herd been represented in the 1922-23 tests, and continued its 1921-22 rate of production, the Association mean yield per cow would have been about 744galls., instead of 701.87galls.

In the circumstances it follows, therefore, that mean improvements per cow on the 1921-22 yields of 4.92galls. of milk and 1.86lbs. of butter fat are far more satisfactory than they appear to be. If we exclude Mr. Halliday's cows from the 1921-22 season, they represent, from the point of view of the remaining combined herds, actual improvements of 64.82galls. of milk and 14.67lbs. of butter fat respectively.

Actual improvements realised since 1920-21 can be brought out more clearly by an examination of the mean results achieved by the five herds represented consistently in the three seasons, namely:

Herds 1/C, 1/E, 1/J, 1/L, and 1/M. These results are summarised in Table II.:-

TABLE II. - *Showing Mean Results of the Five Herds Represented Throughout the Three Seasons.*

Herds.	Mean Milk per Cow.			Mean Butter Fat per Cow.		
	1920-21. Galls.	1921-22. Galls.	1922-23. Galls.	1920-21. Lbs.	1921-22. Lbs.	1922-23. Lbs.
1/C	715.53	898.30	914.91	294.79	362.17	363.87
1/E	636.30	650.70	673.15	303.98	295.87	295.27
1/J	680.17	605.27	643.46	308.72	282.23	289.74
1/L	629.41	621.85	696.23	290.05	290.69	315.85
1/M	469.41	510.69	583.53	223.61	255.08	291.15
Means	648.42	692.57	719.82	285.87	305.83	315.76
Improve	-	44.15	27.25	-	19.96	9.92

Hence, since the first season, the mean improvement in these five herds has been represented by 71.4galls. of milk and 29.89lbs. butter fat. At 10d. per gallon for milk this represents mean improvement in gross production per cow of £2 19s. 6d. per annum.

Similarly, for eight herds represented in the second and third years, the mean improvements per cow were represented by 62.47galls. of milk and 23.92lbs. of butter fat respectively.

We may conclude, therefore, that from the point of view of the Association as a whole, the 1922-23 results are very satisfactory.

Finally, the results of the three seasons have been summarised and contrasted in Table III:—

TABLE III.—*Contrasting Summarised Results of Three Seasons.*

	1920-21.	1921-22.	1922-23.
Mean cows in herd	305.52	290.53	271.61
Mean cows in milk	256.23	235.61	230.04
Mean milking percentage	83.9 %	81.1 %	84.7 %
Mean milking period	306 days	296 days	300 days
Mean milk yield	635.32 galls.	609.95 galls.	704.87 galls.
Mean butter fat test	4.36 %	4.38 %	4.37 %
Mean butter fat yield	298.63 lbs.	306.30 lbs.	308.16 lbs.

MILK YIELD FROM MONTH TO MONTH.

It is of interest to note the extent to which the time of the year affects milk yields in any given district. Data concerning this point on the River Murray have been summarised in Table IV. for the three seasons.

TABLE IV.—*Showing Mean Daily Milk Yields, Month by Month, During the Three Years' Operations of the River Murray Herd Testing Association.*

	1920-21. Galls.	1921-22. Galls.	1922-23. Galls.	Means. Galls.
A.—RELATIVELY TO ALL COWS IN HERDS—				
October	2.06	2.13	2.09	2.09
November	2.00	1.98	1.92	1.97
December	1.92	2.06	2.00	1.99
January	1.93	2.05	2.13	2.04
February	1.78	2.03	2.10	1.97
March	1.71	1.87	1.88	1.82
April	1.81	1.68	1.76	1.75
May	1.78	1.67	1.76	1.74
June	1.73	1.84	1.69	1.75
July	1.83	1.82	1.75	1.80
August	1.91	1.92	1.91	1.91
September	2.08	1.99	2.21	2.06
Means	1.88	1.92	1.93	1.91
B.—RELATIVELY TO COWS ACTUALLY IN MILK ONLY—				
October	2.49	2.58	2.60	2.56
November	2.35	2.41	2.32	2.36
December	2.24	2.47	2.40	2.37
January	2.22	2.49	2.46	2.39
February	2.10	2.42	2.35	2.29
March	2.10	2.25	2.19	2.18
April	2.11	2.08	2.08	2.09
May	2.07	2.04	2.06	2.06
June	2.05	2.28	1.97	2.10
July	2.22	2.28	2.08	2.19
August	2.38	2.48	2.29	2.38
September	2.62	2.61	2.64	2.62
Means	2.24	2.36	2.28	2.29

These data show how remarkably even are the milk yields of the River Murray herds from one end of the year to the other. Relatively

the milk yields to have averaged 2galls. a day over a period of seven months, *i.e.*, from August to February, inclusively, and 1½galls. over the remaining five months, *i.e.*, from March to July.

Similarly, relatively to cows actually in milk and exclusive of dry cows, mean milk yields have been about 2½galls. from August to February, and 2galls. for the balance of the year.

BUTTER FAT YIELDS.

The mean butter fat yields for the three years have been summarised on similar lines in Table V.:—

TABLE V.—*Showing Mean Butter Fat Tests and Mean Daily Butter Fat Production, Month by Month, for a Period of Three Years (a) Relative to Total Cows in Herds, and (b) Relative to Cows in Milk.*

1920-23.	Mean Daily Butter Fat Production.		
	Mean Butter Fat Tests.	Relatively to Total Cows.	Relatively to Cows in Milk.
	%	Lbs.	Lbs.
October	4.20	0.88	1.07
November	4.17	0.82	0.98
December	4.23	0.85	1.01
January	4.29	0.87	1.03
February	4.38	0.86	1.00
March	4.53	0.83	0.99
April	4.51	0.79	0.94
May	4.58	0.80	0.94
June	4.49	0.79	0.94
July	4.50	0.81	0.99
August	4.30	0.82	1.03
September	4.29	0.90	1.08
Means	4.37	0.84	1.00

Here, again, we may note extraordinary regularity in butter fat production from one end of the year to the other. From the point of view of the total number of cows in the herds, the extreme monthly variation is between 0.79lbs. and 0.98lbs., *i.e.*, about 1.10 of a pound; and from the point of view of cows actually in milk 1.08lbs. and 0.94lb., *i.e.*, about 3.20 of a pound. The mean percentage tests, on the other hand, show more pronounced variations, being highest in the months of declining milk supplies.

The relations between milk and butter fat production and percentage tests has been expressed graphically in an accompanying illustration. (See page 537.) It may be recalled that these results represent the means of three consecutive seasons, and concern in the aggregate an average of 291 cows per annum.

The relative horizontality of the mean daily butter fat production graphs tend to show that butter fat production is to all intents and purposes a fixed quantity from one end of the year to the other. On the other hand, the convexity of the butter fat percentage graph corresponds to the concavity of the mean daily milk production graphs; or, in other words, a high test implies reduction in milk supplies, and *vice versa*, the result of which is comparative uniformity in actual butter fat production from one end of the year to the other.

On the whole, I am of the opinion that these mean returns do credit to the Murray Bridge dairymen. Doubtless they can and will be improved upon. Nevertheless, their evenness is such as to indicate that the cows are reasonably fed and cared for throughout the year, and this probably is one of the most important steps in progressive dairying.

INDIVIDUAL HERDS.

In Table VI. have been summarised the results achieved by individual competing herds:—

TABLE VI.—*Showing Results Achieved by Competing Herds in 1922-23.*

Herd.	Period under Test.	Mean Cows in Herd.	Mean Cows in Milk.	Milk Production.		Mean Butter Fat Test.	Butter Fat Production	
				Total	Per Cow.		Total.	Per Cow.
	Months.	Cows.	Cows.	Lbs.	Lbs.	Per cent.	Lbs.	Lbs.
1/C ..	12	30-85	25-84	282,263-5	9,149-09	3-93	11,224-40	363-87
1/U ..	12	14-67	12-14	117,816	7,965-67	4-32	5,090-16	313-43
1/T ..	12	11-69	9-46	75,782-5	6,481-27	5-06	3,835-05	327-10
1/Y ..	12	21-76	18-69	162,053	7,521-71	4-23	6,851-79	318-72
1/L ..	12	17-69	14-48	124,720-5	6,962-31	4-53	5,645-22	315-85
1/R ..	12	13-73	10-96	83,769-5	6,071-05	4-91	4,111-63	268-97
1/E ..	12	21-50	18-90	145,013	6,731-53	4-39	6,370-52	295-27
1/M ..	12	22-19	17-84	129,315	5,835-33	5-00	6,470-58	291-15
1/J ..	12	20-91	17-84	133,037	6,434-55	4-52	6,013-82	289-74
1/X ..	12	18-84	16-44	123,845-5	6,578-25	4-37	5,414-17	287-23
1/Z ..	12	19-54	15-59	125,464-5	6,374-08	4-40	5,519-12	281-55
1/W ..	12	14-62	13-48	108,316-5	7,466-34	3-77	4,082-81	260-93
1/A ..	11	6-54	5-66	45,390-5	6,998-72	4-47	2,027-62	312-28
1/B ..	11	8-39	7-45	50,796	5,946-68	4-44	2,256-55	263-07
1/Cc ..	10	14-36	11-83	70,800-5	4,749-09	4-21	2,999-63	291-64
1/V ..	8	15-13	14-96	65,709	3,402-21	4-52	2,967-92	194-84
1/A ..	2	14-47	13-89	18,162	1,250-64	4-68	847-04	58-38
1/C ..	1	48-37	36-81	38,310	782-32	3-86	1,477-53	391-7
1/I ..	1	14-71	13-71	13,855-5	941-91	3-55	491-87	314
Means	—	17-34	14-68		7,048-68	4-37		308-16
Total production				1,914,475 lbs.			83,698-07 lbs.	
				Milk			Butter Fat	

We should note that in the 1922-23 season 12 herds exceeded the 600galls. mean, one of which was only 11 months under test; four exceeded the 700galls. mean, and one the 900galls. mean. Similarly, six herds exceeded the 300lbs. of butter fat mean, one of which was only 11 months under test, and one herd the 350lbs. mean. These results compare favorably with those of preceding seasons, which are summarised below:—

	1922-23	1921-22.	1920-21
Herds exceeding 900galls. mean	1	1	1
Herds exceeding 800galls. mean	1	2	1
Herds exceeding 700galls. mean	4	6	4
Herds exceeding 600galls. mean	12	9	11

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PRIZES.

The following herds qualified for Government prizes in 1922-23:—

First Prize.—Mr. C. J. Morris's herd, 1/C, with a mean yearly output of 363.87lbs. butter fat from 914.91galls. of milk.

Second Prize.—Mr. L. J. Foster's herd, 1/U, with 343.15lbs. of butter fat from 769.57galls. milk.

Third Prize.—Mr. M. S. Cheetham's herd, 1/T, with 327.10lbs. of butter fat from 648.13galls. of milk.

THE COMPETING HERDS.

The task of inspecting and reporting upon the competing herds at the end of the year's operations has always been carried out by the Assistant Dairy Instructor, Mr. H. J. Apps. In connection with the 1922-23 seasons he reports in general terms as follows:—

"Upon my third annual inspection of the herds of the members of the Murray Bridge Herd Testing Association, I could not help noticing the vast improvement which has taken place in the general condition and type of the cows, especially in the herds of the original members. The general condition of all the herds is exceptionally good, and not in any case did I notice any cows in low condition, and considering the cattle have just gone through a very wet season, it conclusively proves that they must have received very good treatment. It is indeed very pleasing to report that to-day the benefit of herd testing is bearing fruit, and some of the vital points in connection with successful dairying, viz., better breeding, feeding, and the culling out of unprofitable cows, is convincingly demonstrated. During my first visit it was surprising to notice the number of inferior herd bulls; but quite a transformation scene has taken place in this direction, for in every herd of the original members a pure-bred bull is kept and several of the sires have good milk and butter production at their back, and it is worth noting that quite a number of them are prize takers at various shows, including championships at the Royal Agricultural Society.

Only in one instance did I inspect a bull of the present members that cannot claim purity of blood; but in this case it might be pointed out that none of this animal's progeny is being reared. The wisdom of heading the herd with a pure-bred sire was pointed out to the owner, and no doubt, as the records of the cows become known, he will fall into line with the others and secure a worthy sire.

Not only in one or two herds was it strikingly noticeable that great improvement had taken place both in condition and degree of uniformity, but practically every herd has shown marked improvement, which is especially noticeable when contrasting them with neighboring stock.

At last it is becoming apparent that the members are breeding with some definite object in view, either by the introduction of pure-bred cows or by grading up the herd.

Members realise and appreciate the value of such societies, and although the terms of the Government subsidy expire on the completion of the third year, nevertheless they are particularly anxious that its operations should not be allowed to lapse."

HERD 1/C—MR. C. J. MORRIS.

Mr. Morris is to be congratulated on having secured the position of winning herd for 1922-23. In 1920-21 he occupied seventh place; in 1921-22 second, and in 1922-23 first place. These successes must be highly gratifying to him. Mr. Apps reports as follows on his herd:—"This herd of 33 cows consists of fine, high-grade Friesians; they are in great milking condition. Three years' work of culling, together with the introduction of a few heifers, have brought about a wonderful degree of uniformity in type. The knowledge of the performance of the cows, and the services of a good type of Friesian bull, with great production records at his back, should eventually lead to further improvement. This herd has probably made the greatest improvement of any in the society, and reflects great credit on its owner."

In view of the excellent results secured by Mr. Morris, it will be of interest to contrast his returns over the three seasons:—

TABLE VII.—*Contrasting Results from Mr. C. J. Morris's Herd over Three Seasons.*

	1920-21.	1921-22.	1922-23.	Total improvement.
Mean number of cows in herd	45.07	27.99	30.85	—
Mean number of cows in milk	36.54	23.57	25.84	—
Percentage of cows in milk	81.07	84.21	83.41	—
Mean milking period	296	307	306	—
Mean milk per cow per annum.....galls.	715.53	898.3	914.91	199.38
Mean butterfat per cow per annum.lbs.	294.79	362.17	363.87	69.08
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Mean value of output at 10d. per gall. .	29 16 3	37 8 7	38 2 5	8 6 2

It will be noted that since herd testing started, Mr. Morris's herd has improved its mean output of milk per cow by approximately 200galls., and the mean output of butter fat by 69lbs. The increase in value of the output of milk per cow at current wholesale milk prices is represented by £8 6s. 2d. Such results should prove a good advertisement for the value of herd testing to the dairyman, and incidentally to the State.

In 1922-23 Mr. Morris's herd was composed as follows:—

Heifers on their first calf	9
Three-year-old cows	3
Four-year-old cows	2
Five-year-old cows	2
Aged	17

It will be noted that the proportion of heifers on their first calf—over 27 per cent. of the total herd—was rather high, and leads one to anticipate that mean yields should be considerably higher next season.

HERD 1/U—MR. L. J. FOSTER.

Mr. Foster's herd secured second place in the 1922-23 season; it was third in 1921-22, but was not represented in 1920-21. Mr. Apps reports as follows on this herd:—"The 13 cows of this herd include grade Friesians and a few Shorthorns and Jersey crosses. They are in tip-top milking condition."

Heifers on their first calf	4
Four-year-old cows	1
Five-year-old cows	2
Aged	6

The results of the two years' tests are contrasted below in Table VIII.:

TABLE VIII.—*Contrasting Results from Mr. L. J. Foster's Herd over Two Seasons.*

	1921-22.	1922-23.	Improvement.
Mean number of cows in herd	12.70	14.67	—
Mean number of cows in milk	10.63	12.14	—
Percentage of cows in milk	83.70	82.75	—
Mean milking period days	306	302	—
Mean milk per cow per annum galls.	778.46	796.57	+ 18.11
Mean butterfat per cow per annum lbs.	353.07	343.15	— 9.92
	£ s. d.	£ s. d.	£ s. d.
Mean value of output at 10d. per gall.	32 8 9	33 3 10	+0 15 1

Although, on the whole, Mr. Foster's results are satisfactory, his herd cannot be said to have made much progress in the second season. Indeed, in the matter of mean butter fat per cow, there has been a decrease of close on 10lbs. per cow.

HERD 1/T—MR. M. S. CHEETHAM.

Mr. Cheetham's herd, which was tenth in 1921-22, secured third place in 1922-23. It was not represented in the Association in 1920-21. Mr. Apps reports as follows on this herd:—"This herd of 13 cows consists of grade Jerseys. They are in splendid milking condition. The herd sire is a Jersey."

In 1922-23 the herd consisted of:—

Heifers on their first calf	5
Three-year-old cows	3
Four-year-old cows	1
Five-year-old cows	3
Aged	1

Again the high proportion of young cows—over 35 per cent. of heifers on their first calf—leads one to anticipate a much higher output in the near future.

The results of the two seasons have been contrasted below in Table IX:—

TABLE IX.—*Contrasting Results Secured by Mr. Cheetham's Herd in Two Seasons.*

	1921-22.	1922-23.	Improvement
Mean number of cows in herd	13-11	11-68	—
Mean number of cows in milk	10-35	9-16	—
Percentage of cows in milk	78-95	80-99	—
Mean milking period	288 days	296 days	—
Mean milk per cow per annum	559-91galls.	618-13galls.	88-22
Mean butterfat per cow per annum	281-62lbs.	327-10lbs.	45-48
Mean value of output at 10d. a gallon	£23 6 7	£27 0 1	£3 13 6

Mr. Cheetham is to be congratulated on the improved results of the second season. His milk output has increased by 88.22galls. per cow, or 15.76 per cent., which at whole milk prices represents an increased gross return of £3 13s. 6d. per cow. His butter fat output has increased by 45.48lbs. per cow, or 16.14 per cent. These results are very encouraging, and it is to be anticipated that Mr. Cheetham will improve upon them next year.

HERD 1/Y—MR. S. G. STARR.

Mr. S. G. Starr, who joined the Association in 1922-23, is to be congratulated on securing fourth place for his herd, with a mean output of 318.72lbs. of butter fat from 752.17galls. of milk per cow. This herd consists almost entirely of young animals, eight out of 24, or 33 per cent., being heifers on their first calf. There is, therefore, every reason to anticipate early improvement in yields. Mr. Apps reports as follows on this herd:—"This herd consists of 24 cows of Jersey and Shorthorn crosses in really first-class milking order. The herd bull is a Jersey."

HERD 1/L—MR. H. H. CLARK.

Mr. Clark has been a member of the Association since its earliest days, and is to be congratulated on securing in 1922-23 a mean output of butter fat per cow of 315.85lbs. from 696.23galls. of milk. Mr. Apps reports as follows on this herd:—"This herd of 18 cows consists of Jersey and Shorthorn grades, which are in great milking condition. The herd sire is a Friesian, the owner having definitely decided to grade his herd to Friesian blood."

Mr. Clark's results over the three seasons have been contrasted in Table X:—

TABLE X.—*Contrasting Results Secured by Mr. Clark's Herd during Three Successive Seasons.*

	1920-21.	1921-22.	1922-23.	Total Improvement
Mean number of cows in herd ...	12-96	13-99	17-49	—
Mean number of cows in milk ...	10-85	11-58	14-48	—
Percentage of cows in milk	83-72	82-77	81-85	—
Mean milking period	306 days	302 days	299 days	—
Mean milk per cow per annum ...	629-41galls.	621-85galls.	696-23galls.	66-82 galls.
Mean butterfat per cow per annum	290-05lbs.	296-69lbs.	315-85lbs.	25-80lbs.
Mean value of output at 10d. per gallon	£26 4 6	£25 18 2	£29 0 2	£2 15 8

Thus, then, in the third season Mr. Clark has improved his mean output of milk per cow per annum by 66.82galls., representing at current prices £2 15s. 8d., and his mean output of butter fat by 25.8lbs. These results are satisfactory.

Herd 1/R.—A mean output of 298.97lbs. of butterfat from 607.11galls. of milk. Mr. Apps reports on this herd as follows:—
“This herd of 17 cows of Jersey and Shorthorn grades is in splendid condition. The herd sire is a Jersey.”

Herd 1/E.—A mean output of 295.27lbs. of butter fat from 673.15galls. of milk. Mr. Apps reports on this herd as follows:—
“This herd of 20 cows consists of grade Friesians and Jerseys; they are in splendid condition. The herd sire is Jersey.”

Herd 1/M.—A mean output of 291.15lbs. of butter fat from 583.53galls. of milk. Mr. Apps reports on this herd as follows:—
“This herd contains Jerseys and Jersey grades; they are in very good milking condition. The sire is a Jersey.”

Herd 1/J.—A mean output of 289.74lbs. of butter fat from 643.46galls. of milk. Mr. Apps reports as follows on this herd:—
“In this herd are 18 cows, representing Jersey and Shorthorn grades; they are in the best of milking condition. The herd bull is a Friesian, and it is the owner's intention to grade up his herd to Friesian blood.”

Herd 1/X.—A mean output of 287.23lbs. of butter fat from 657.83galls. of milk. Mr. Apps reports as follows on this herd:—
“This herd includes 18 cows, representing Jersey and Shorthorn crosses. They are in very good milking condition. The herd bull is a Shorthorn.”

Herd 1/Z.—A mean output of 281.55lbs. of butter fat from 637.41galls. of milk. Mr. Apps reports as follows on this herd:—
“This herd consists of 21 Jersey and Shorthorn crosses, in really first-class milking condition. The herd bull is a Jersey.”

Herd 1/W.—A mean output of 280.93lbs. of butter fat from 746.63galls. of milk. Mr. Apps reports as follows on this herd:—
“The 21 cows in this herd are grade Friesians and grade Jerseys. They are in first-class milking condition. The herd sire is a Friesian.”

The seven remaining herds did not complete 12 months' lactation, and do not call for special comment. Attention should, however, be called to Herd 1/AA (Mr. J. J. Victory). This herd yielded 312.28lbs. of butter fat from 699.87galls. of milk in a period of 11 months. Had a twelfth month been included, the butter fat yield would probably have been in the neighborhood of 340lbs., which would have placed the herd third on the list for the year.

CHANGES IN THE HERDS DURING THE YEAR.

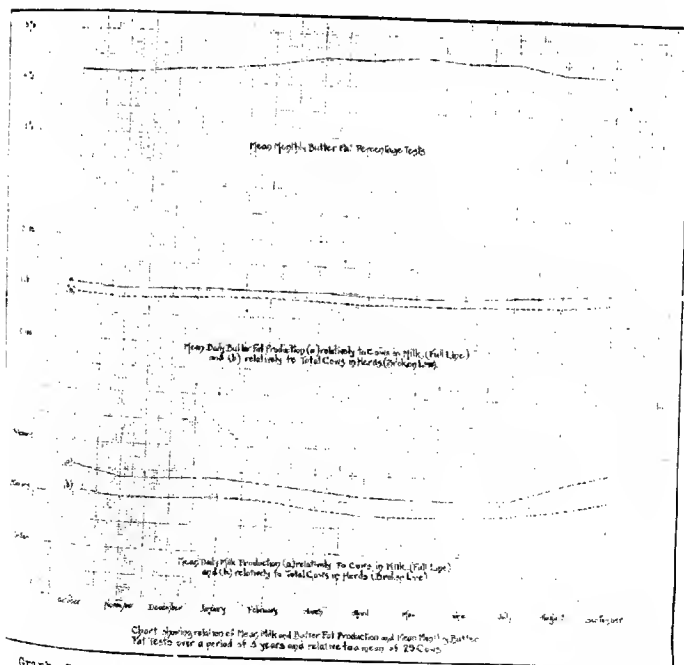
Changes affecting numbers in the herds of the Association during 1922-23 are shown on next page in contrast with those of the preceding years.

TABLE XI.—Showing Fluctuations in Numbers During Three Years.

	1922-23.	1921-22.	1920-21.
Opening numbers	280	287	246
New members during year	47	—	—
Purchases	66	35	24
Heifers on first calf	69	41	22
Sales	—	—	—
Deaths	91	39	33
Resignations during year	7	17	2
	81	—	—
Totals	462	363	292
Less reductions	179	56	35
Closing numbers	283	307	257

Relatively to the two opening years, notable features in 1922-23 were the resignation of old members and the admission of new ones during the course of the year; heavy sales of presumably unsatisfactory or old cows, and a large proportion of presumably unsatisfactory calves (over 25 per cent. of the mean number of cows present during the 12 months).

It may be noted that during the three years the mean number of cows under test per annum was represented by 289 head, and the mean number of deaths by 8.67 per annum. This represents a mean percentage of about 3 per cent.



Graphs Showing Mean (3 years) Monthly Milk, Butter Fat, and Butter Tests of River Murray Herd Testing Association.

SPECIALLY MERITORIOUS COWS IN THE ASSOCIATION.

The River Murray Herd Testing Association is essentially an association of dairymen, whose sole income is the returns from their cows. It does not, therefore, include special breeders, who at times, are tempted to make record yields their main objective, independently of the profitableness or otherwise of the latter. Nevertheless, by careful selection and treatment, members of the Association have succeeded in securing some very satisfactory records from some of their cows. I append below a summary of some specially high yields secured during three years' operations:—

TABLE XII.—*Showing Number of Cows Having Yielded 1,000galls. of Milk and 400lbs. of Butter Fat in the Course of a Year.*

COWS HAVING YIELDED 1,000GALLS. OF MILK AND OVER.—			
	1922-23.	1921-22.	1920-21.
1,700galls. and over	1	—	—
1,600galls. and over	1	1	—
1,500galls. and over	1	2	1
1,400galls. and over	1	2	1
1,300galls. and over	2	4	1
1,200galls. and over	3	7	5
1,100galls. and over	4	15	8
1,000galls. and over	11	24	14

COWS HAVING YIELDED 400LBS. OF BUTTERFAT AND OVER—			
	1922-23.	1921-22.	1920-21.
850lbs. and over	—	1	—
800lbs. and over	1	2	—
550lbs. and over	1	3	1
500lbs. and over	1	4	2
450lbs. and over	5	9	8
400lbs. and over	19	30	16

For the most part the heavy yielding cows of 1921-22 and 1920-21 belonged to Mr. Halliday's herd, which was, unfortunately, withdrawn in 1922-23. In the latter year, however, Mr. Morris had nine cows which yielded over 1,000galls. of milk, one of which established a record for the society with 1,773galls. of milk. Similarly, in the same season, seven of Mr. Morris's cows yielded over 400lbs. of butter fat, one of them attaining 637.9lbs. In the same year, Mr. Foster had one cow which yielded over 1,000galls. of milk, and four cows over 400lbs. of butter fat. One of Mr. Cheetham's cows yielded over 1,000galls. of milk, and two of them over 400lbs. of butter fat. Similarly, two of Mr. Starr's cows yielded over 400lbs. of butter fat. Finally, in the herds of Messrs. Baldock, Paterson, Cailles, and Clark respectively, one cow in each herd exceeded the 400lbs. of butter fat standard.

COMPARATIVE FINANCIAL RETURNS FROM INDIVIDUAL HERDS OVER THE THREE SEASONS.

I have summarised in Table XIII. the estimated financial returns from individual herds over the three years.

TABLE XIII.—*Showing Value of Production per Cow of Competing Herds over the Three Seasons.*

Herd No.	1922-23.		1921-22.		1920-21.	
	As Whole Milk.	As Butter-fat and Skim Milk.	As Whole Milk.	As Butter-fat and Skim Milk.	As Whole Milk.	As Butter-fat and Skim Milk.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
I C.....	38 2 5	30 14 9	37 8 7	30 10 2	29 16 3	24 11 5
I U.....	33 3 10	28 10 4	32 8 9	29 1 1	—	—
I T.....	27 0 1	26 8 0	23 6 7	22 14 10	—	—
I V.....	31 6 10	26 11 7	—	—	—	—
I R.....	29 0 2	25 19 10	25 18 3	24 3 8	26 4 5	23 15 11
I B.....	25 5 11	24 4 8	19 1 10	18 5 7	—	—
I E.....	28 1 0	21 9 0	27 2 3	24 6 8	26 10 3	24 15 5
I M.....	24 6 3	23 10 10	22 10 7	20 16 8	19 11 2	17 14 8
I J.....	26 16 3	23 17 6	25 4 5	23 2 0	28 6 10	25 8 0
I X.....	27 8 2	23 16 2	—	—	—	—
I Z.....	26 11 2	23 5 9	—	—	—	—
I W.....	31 2 2	24 0 1	—	—	—	—
Means....	29 7 5	25 10 9	27 15 7	24 13 11	28 6 9	24 15 9

In the above Table, whole milk has been valued at 10d. a gallon, butter fat at 1s. 4d. a lb., and skim milk at 2d. a gallon.

To be noted, in the first place, that notwithstanding the withdrawal of a large herd of exceptionally heavy milkers, the Association as a whole has improved the average output per cow by about £1 per cow. I have already pointed out how much greater this improvement actually is if account be taken of Mr. Halliday's herd. On the other hand, Herd 1/C (Mr. C. J. Morris) has improved the mean output per cow by £6 0s. 4d. to £8 6s. 2d., according as milk is sold as whole milk or as cream. Other examples of very satisfactory progress are those of Herd 1/R, showing an improvement of £5 19s. 1d. to £6 4s. 1d. per cow, and Herd 1/M, showing an improvement of £4 15s. 1d. to £5 16s. 2d. per cow.

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DOWNY MILDEW

(*Plasmopara Viticola*).

[By D. G. QUINN, Viticultural Instructor.]

Although this well-known mildew was dreaded by Australian vignerons long before it visited our shores, it has now been with us some years; but, so far, it has not in South Australia exhibited its ability to spread and devastate our viticultural areas. However, it would be a great mistake for the vinegrowers of this State to treat downy mildew with contempt, simply because it has failed to give us a demonstration of its powers in the past.

Minor outbreaks have been observed each year since the introduction of the disease, such as, for example, that in the Marion district about this time last year. In the past we have had to thank the dry, hot weather conditions which followed the outbreaks or late appearance of the fungus for checking the general spread of the disease. We cannot, however, always trust to the weather, for sooner or later it will fail us, in which case those not fully conversant with the disease, and the controlling measures necessary, must be prepared to suffer severely.

Many admirable papers treating with this trouble have been published in the past; but it is possible that many of them have not come under the notice of some of the vignerons who read the *Agricultural Journal*; hence, to fill this gap, the following article has been drawn up. Furthermore, it appears that the characteristics and the correct manufacture of the chief sprays advised are not wholly understood by all and special attention has been devoted to this phase of the subject.

These articles have given a full historical review of the spread of the disease throughout the vinegrowing areas of the world, a description of the disease, and the recognised mode of combating it, so these are but briefly touched on herein.

HISTORICAL REVIEW.

This disease was accidentally introduced into Europe from North America in 1879 and since that date it has proved itself to be the most disastrous of all the fungoid pests which attack the vine. In humid climates the treatment of this disease has proved to be very laborious and costly, but in South Australia, with the aid of our hot, dry summer, we hope to be able to control it with far fewer sprayings than would be deemed sufficient in many of the other vine growing countries of the world.

The first outbreak of the disease in Australia occurred in January, 1917 at Rutherglen in North-eastern Victoria, and in the following year the season proving favorable to it, 90 per cent. of the normal crop of the district was lost. Since its introduction to Australia the disease has spread rapidly. In 1918 the Yanco, Mirrool, and Hunter River districts of New South Wales were infected, and in 1921 it was reported at Mildura, Renmark, Watervale, Langhorne's Creek,

and Angaston, and last year a slight outbreak occurred in the Marion district near Adelaide. The fungus has not yet been recorded in Western Australia.

DESCRIPTION OF THE DISEASE.

This disease only attacks the herbaceous parts of the vine. It appears first on the upper surface of the leaf as a discolored irregular patch of a slightly paler hue than the remainder of the leaf, and with the advent of moist conditions, the under surface of the patch becomes covered with a dense white downy substance. This is rarely seen on the upper surface of the leaves and not often on the shoots or flowers. It is, however, not unusual to see the fungus attacking the fruit. If the berries are attacked early in the season, the flesh presents a greyish white appearance and later dries up; this form has been termed



FIG. 1.—Grey Rot or Bunch Mildew. Diseased vines shoot in early spring—lower bunch covered with characteristic white down, which is also visible on upper half of stem, the twisting of which is due to fungus action. Reproduced from *Le Mildieu* by L. Ravaz.



FIG. 2.—Oil spots on upper side of leaf; corresponding with these on the under side, the white down develops in moist weather. (After Ravaz).

"Grey Rot". If, on the other hand, the attack occurs when the fruit is farther advanced, the berries first become more or less discolored, finally assuming a dull red color, soften, and fail to ripen. This form has been termed "Brown Rot". The crop may be attacked in this way right up to the turning of the berries, and, failing proper treatment, a few days will suffice to spoil the whole of the year's production.

The leaves are most subject to the attack, but even in a mild case the crop suffers indirectly owing to the functions of the leaves being disordered, the fruit yielding juice of lower quality, and in smaller

quantities than normal. During a serious visitation of the disease the whole of the foliage may fall so that not only will the current season's crop be ruined, but that of the following season will be seriously compromised because the premature fall of the leaves prevents the accumulation of those reserve substances in the tissues of the plant which are so necessary to give the vine a healthy start in the following spring. If this is allowed to happen several years in succession, many of the vines will be lost, in fact when the disease first appeared in Europe, whole vineyards were wiped out before a means was discovered to retard it.

LIFE HISTORY OF THE FUNGUS.

Downy mildew is an endophytic fungus and is therefore somewhat difficult to deal with. It produces its summer spores (conidia) at the ends of long columns (conidiophores) which issue from the stomata of the leaves on the under surface. Under favorable conditions these spores are produced with extreme rapidity. They fall upon the upper surface of other leaves or are carried by the wind to set up new centres of infection. There is one peculiarity about the spores of downy mildew and that is they must be immersed in free moisture for some time before they will germinate and then they do not germinate like the spores of most other fungi by simply throwing out a penetrating tube, but by subdivision into zoospores. These zoospores are delicate oval bodies provided with "cilia" or vibrating appendages which enable them to move about in a film of water. These zoospores then swim about, and when one comes upon a breathing pore of a vine leaf or fruit, as the case may be, it throws out a germ tube which passes *via* the stoma into the internal tissues of the plant. From now on the fungus develops internally and cannot be reached by any spray which does not destroy the leaf. The only time when the fungus is assailable is when the delicate zoospores are swimming about in the film of moisture on the leaves or fruit of the plant. Once the leaf has been infected, the germ tube ramifies into what is known as the mycelium and within about seven days the development of the fungus causes the appearance of the characteristic pale spot, somewhat resembling the effect produced by a drop of oil on green paper.

This "oil spot" now remains latent until the presence of moisture is felt and then a fresh generation of spores is immediately thrown out. This occurrence may be noted with the naked eye, the spores massed together appearing like a pinch of glistening salt hanging to the under side of the "oil spot."* It is in this manner that the disease multiplies and spreads through the summer months.

Before passing on it might be well to emphasize the fact that the "oil spot" stage is the critical period because with the coming of a rain the fungus will throw out enormous numbers of summer spores which will contaminate fresh centres. On the other hand if the season remains dry the diseased spot will dry up and fall out or the infected leaf may drop off leaving the leafstalk attached to the cane.

* If a pale patch is noted upon a leaf, and corresponds to the description of an "oil spot," the presence of the fungus may be proved by enclosing the leaf in damp blotting paper and storing it in a warm room. If such is a true "oil spot" the characteristic white efflorescence will appear after the lapse of 12-24 hours.

Towards the end of the summer, the fungus inducing mildew gives rise to "Oospores" or winter spores. These are produced within the tissues of the leaf and they are simply thick walled cells containing numerous zoospores. Oospores can pass through the winter without injury and it is said they can even pass through the digestive organs of sheep without injury.

With the fall of the leaves and their subsequent decay, the winter spores are scattered all over the soil of the vineyard, and they lie dormant until the warm damp weather of mid-spring causes them to burst into life, the zoospores being splashed or blown on to the foliage and thus the life cycle is repeated once again.

The disease only spreads appreciably when the conditions of heat and moisture combined make the season favorable. Bourcart states that the oospores take more than a day to germinate when bathed in water at a temperature of 52deg. Fahr. and so it follows that it is only during warm yet very wet weather that the disease is to be feared. These conditions are somewhat rare during early spring, but they are frequently experienced during the middle of October.

The disease is therefore somewhat irregular in its appearance, but after the infection has once taken place, if several heavy rains are experienced at intervals of seven to fourteen days during the warm weather of late spring, the disease will cause much consternation among owners of infected but unsprayed vineyards. On the other hand the South Australian summer is generally hot and dry and unfavorable to fungoid life, but periodically a wet summer is experienced and when such is the case this disease will have to be watched for and treated intelligently, as it is capable of spreading much more rapidly than any of the other fungus diseases we have had to deal with in the past.

Strong winds, either hot or cold, check the spread of the disease and so exposed vineyards are much less subject to it than sheltered ones.

According to experience gained in Victoria and New South Wales not any of the varieties grown there appear to be immune from attack, and another interesting point is that the tractor sprayer gives better results in trellised vineyards than where the vines are pruned on the "gooseberry" bush system.

TREATMENT.

It is impossible to reach the winter spores because they lie scattered all over the ground where the diseased leaves of the previous summer have decayed, and it is also impossible to reach the fungus once the vines are infected, owing to the fact that the fungus is an endophyte. The treatment therefore can only be a preventive one, and it aims at destroying the zoospores before they enter the herbaceous portions of the plant. These spores are very sensitive to the soluble salts of copper, very dilute solutions of which are sufficient to bring about their destruction.

Any substance applied to the leaves as a spray, to be of any value, must only be slightly soluble, so that the first shower of rain does not wash it off, and yet sufficiently soluble for a rain or dew drop to be able

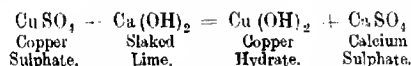
to dissolve a trace of copper. The compound must maintain its properties when exposed to the air, and it must also be sufficiently adhesive to remain on the leaves after drying.

The soluble salts of copper are the most powerful fungicides known. Pure copper sulphate is too soluble, for it not only washes off easily but is absorbed by the leaves and causes their destruction.

The preparation known as Bordeaux Mixture gives the best results and it may be interesting to mention that this compound, which has since proved to be the most valuable fungicide known, was discovered by chance in this manner. To prevent marauders from gathering the ripe grapes on the vines adjacent to the roads it was customary, long before the appearance of mildew, in the different communes of Bordeaux and Burgundy to spray the grapes with milk of lime, to which was added a little blue vitriol to color it. As far back as 1882 it was found that these borders were less subject to mildew than the remainder of the vineyard. This empirical remedy was thus recommended to combat the mildew under the name of Bordeaux mixture. In the early days 15 per cent. of lime and 8 per cent. of bluestone was used and this was spread by means of small heather brooms.

From year to year the strength of the spray was reduced owing to the results of experiments which showed that two and even one per cent. solution of blue vitriol accompanied by sufficient lime to neutralize it were just as efficacious as the stronger solutions, and to-day these strengths are accepted as the best.

The copper hydrate is the active substance in Bordeaux mixture and it is prepared by precipitating a soluble salt of copper by an alkali thus:—



The copper hydrate may slowly change to copper carbonate but as such it is just as effective as in the former state.

Both these substances are almost insoluble in water, but are slightly soluble in water charged with weak acids, e.g. (H_2CO_3 , &c.). The amount rendered soluble in practice on a wet leaf is always so small that the plant is never in contact with a poisonous amount of a soluble copper salt, but the infinitesimal quantities present not only suffice to preserve the plant from the invasion of injurious fungi, but also it is stated, stimulates the vitality of the foliage treated.

The sulphate of lime, on the other hand, has no beneficial action, but the presence of an excess of lime not only reduces the adherence of the spray, but reduces the fungicidal value of the copper hydrate also.

PREPARATION OF BORDEAUX MIXTURE.

Two solutions are prepared, one of blue vitriol (bluestone), the other milk of lime. The blue vitriol should be as pure as possible and should be dissolved in wooden, copper, glass or stoneware vessels. Those of tin or iron should be avoided as these metals decompose it.

To facilitate the solution of this salt, it is placed in a bag suspended just below the surface of a vessel filled with rainwater. If one should

be pressed for time, it may be dissolved in warm water, which must be cooled before use to obtain the fine gelatinous precipitate desired. The lime used should be good freshly burnt and lumpy quicklime, and this is slaked by adding water gradually, after which the milk of lime is stirred and carefully strained through a fine sieve.

To obtain a fine gelatinous precipitate, having a maximum adherence to the leaves, it is advisable to run these two solutions simultaneously and slowly into the spray tank, stirring continuously. (The next best mixture is made by running the milk of lime into the spray tank containing the dilute copper sulphate solution.)

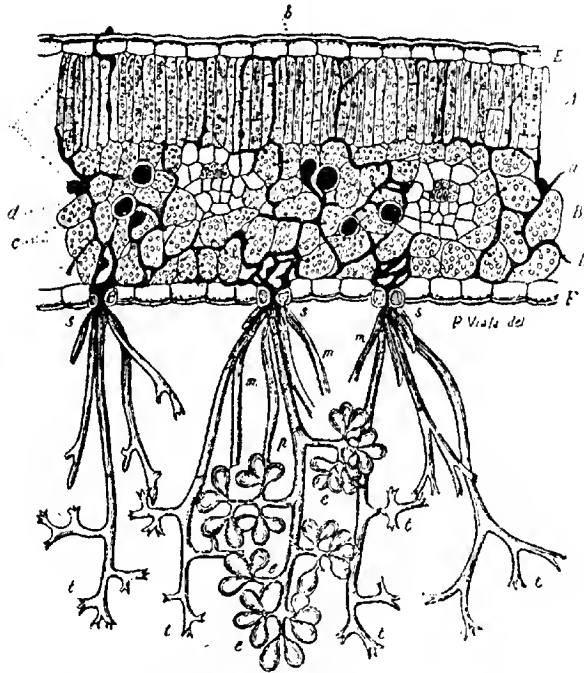


FIG. 1.—Downy Mildew—*Plasmopara viticola*. B. and de T.

Diagrammatic section of a vine leaf infested with Downy Mildew, showing how the mycelium of the fungus (a) circulates between the cells which constitute the normal tissue of the leaf. At s, s, s are three stomata or breathing pores, through which the conidiophores or spore-bearing filaments emerge. It is these which constitute the characteristic white down on the under side of the leaves. Conidia, or summer spores (e) are, however, only shown on one filament. The round black bodies with white rim, in the interior of the leaf, are oospores.—(After Viala.)

[Reprinted from the *Journal of the Department of Agriculture of Victoria*.]

When dealing with pure chemicals 14lbs. of quicklime suffice to precipitate 62½lbs. of bluestone, but in practice the amount of lime used is always greater because the lime is never pure. The amount of lime therefore varies according to its purity from 1lb. to 3lbs. of lime to every 3lbs. of copper sulphate. Litmus or Phenolphthalein paper may be used to indicate when sufficient milk of lime has been added to precipitate the copper solution.

The mixture known as the one per cent. solution contains 10lbs. of blue vitriol and 3½lbs. to 10lbs. of quicklime per 100 gallons of water. In wet seasons a two per cent. solution is advisable, but in normal seasons the formula common amongst our fruit growers, viz. 6lbs. copper sulphate, 4lbs. quicklime to 50 gallons of water, may be relied upon to give satisfaction. Five ounces of casein or a quarter of a pound of soap per 50 gallons may be added to increase the spreading power of the spray, the former being dissolved in a 10 per cent. solution of washing soda.

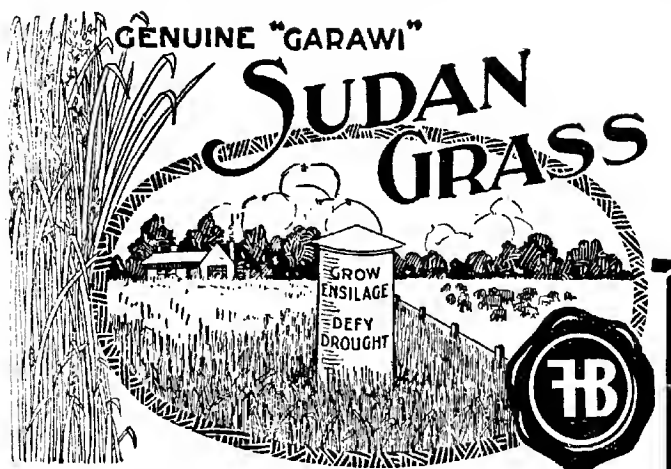
The mixture should be just alkaline which may be shown by the fact that phenolphthalein paper turns pink on immersion, red litmus blue, or if a bright wire nail be immersed for several minutes no copper should be deposited on its surface. If allowed to stand the bluish copper hydrate should settle and the liquid above should be absolutely colorless, a blue tint showing the presence of unchanged copper sulphate. The mixture must respond to all these tests otherwise it is unfit for all the purposes for which it is intended.

The mixture is the more adherent, the more nearly neutral it is, and also it must not be allowed to stand long before use. Continual agitation is necessary during its application, because the active substance, the copper hydrate, is not in solution, but simply in suspension.

Referring to the effect of this spray on the summer spores of mildew, Boucart states "If the water necessary for the development of the spore contains the minimum amount of copper the conidium does not germinate, or if it germinates the germinating tube cannot penetrate into the leaf. The object of the Bordeaux spray is thus to prevent the conidia from forming new hotbeds of infection by stopping their evolution. Against mildew one per cent. mixtures have always proved quite as efficient as the generally recommended two per cent. mixtures and it has been found better to renew the thin copper deposit on the leaves frequently than to spread a thick layer on them several times a year, as these organs are continually growing and being washed by rains. The great point is to cover all the surface of the vine uniformly by copious and careful sprayings with Bordeaux mixture."

TIME TO SPRAY.

The spraying, being essentially a preventive treatment, must precede the infection of the plant, for once the fungus has penetrated the tissues, any fungicide is powerless so far as that particular invasion is concerned.



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The warm wet weather experienced in spring causes the germination of the oospores, and Victorian experience has shown that the first spraying should be applied shortly before the middle of October when the young shoots have reached a length ranging between six inches and ten inches.

The second spraying should be applied shortly after the flowering of the vines or three to four weeks after the first spraying; this will serve to protect the young fruit bunches and the growth produced since the first spraying from infection. In some instances it may be deemed advisable to apply a third treatment about a month after the second spraying.

If the weather conditions during any part of the growing period appear to be unusually conducive to the spread of the fungus, additional sprayings may be applied with advantage, if the object is to renew former coats of spray which have been subjected to heavy rains, or to cover growth which has appeared since the previous spraying.

As to the application of the sprays, little need be said except that fast two wheeled tractor sprays will shortly be looked upon as one of the essential implements of a vineyard—one being allowed for each 100 acres under vines. For very hilly or closely planted country which does not permit the use of wheeled vehicles, simple outfits are available, which are worked by compressed air and attached to the pack-saddle of a horse.

A SUGGESTION FOR THE MANUFACTURE OF BORDEAUX MIXTURE IN LARGE QUANTITIES.

Near the water supply place an old hogshead or puncheon from which the head has been removed, and, the evening prior to the day of spraying, set sufficient bluestone for the day's work to dissolve, adding one gallon of water for each pound of bluestone. On the following day, if using the 6-4-50 mixture, as a spray-cart draws up (capacity 50 gallons) add 40 gallons of water to the tank, then with the aid of a measure add six gallons of the bluestone solution. Slake the lime in the following manner:—

Put the required weight in a bucket and add a pint of water. When absorbed add another pint, and so on until the lime will take up no more water, when the bucket may be filled and stirred freely. Lime generally contains a varying quantity of gritty impurities, hence it is necessary to strain the milk of lime through a fine gauze, the mesh not exceeding the diameter of the outlet in the spray nozzles. The diluted lime water is then vigorously stirred into the spray tank, making the total liquid up to the 50galls. mark. It is then applied to the vines within an hour or two.

It has been previously pointed out that a considerable excess of slaked lime is undesirable, hence if the owner ascertained, by the use of an indicator such as litmus paper, the quantity of local lime necessary to precipitate the quantity of bluestone he is using, on the first spray-cart sent out, the same quantity could be added to each

of the following refills whilst the lime in hand lasts, provided the period does not exceed 8 to 10 days. Sixpence-worth of litmus paper would be more than sufficient for the season, and can be obtained from all commercial chemists.

At each spraying fresh lime should be obtained from the kiln, although on a small scale it can be preserved in airtight tins.

EFFECT OF SPRAYS ON THE RESULTING WINE.

With reference to the effect of late sprayings on the wine eventually produced, Millardet, Guyon, and numerous other chemists and hygienists have shown that copper salts sprayed on the grapes are conveyed in a very small amount into the fermenting vat and are almost totally eliminated in the lees shortly after the fermentation of the must has been completed.

BURGUNDY MIXTURE.

Another compound possessing the same fungicidal value as Bordeaux mixture has been termed the copper-soda or Burgundy mixture.

For certain purposes this mixture possesses several distinct advantages over the former, and these may be summed up as follows:—

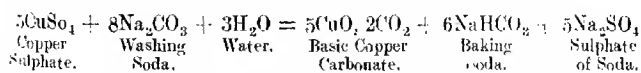
1. The chemicals necessary may be stored indefinitely without fear of deterioration.

2. No trouble arises from the blockage of the spraying nozzles. (In the case of Bordeaux mixture, constant trouble is here experienced if the milk of lime is not strained very effectively.)

3. The fungicidal and adhesive qualities of correctly prepared Burgundy mixture are quite equal to those of Bordeaux mixture.

The Burgundy mixture has long been the favorite fungicide amongst our orchardists for combating the shothole of the apricot (*Clasterosporium carpophilum*), the peach curl leaf (*Erouseus deformans*), and the black spot or scab of the pome fruits (*Fusicladiums*), during the early spring; but experience has shown that the spray, when applied later in the season, frequently burns the foliage rather badly, even when the correct mixture, namely, 6lbs. of bluestone, 11-11½lbs. of washing soda per 50galls. of water, is used.

Spencer Pickering states that the cause of the damage is mainly due to the bi-products—baking soda and sulphate of soda—which invariably occur, as the following equation will show:—



Furthermore, if any error occurs, either in the weighing or the composition of the original ingredients (bluestone or washing soda), it will lead to the presence of an excess of one or the other, and thus increase the "burning" effect.

For these reasons, we advise that Bordeaux mixture be preferred to Burgundy mixture for combating mildew, and, in fact, for protecting any plant in leaf against endophytic fungi. With the former spray,

provided that it is properly made and slightly alkaline, the vigneron can rest assured that he is using the most effective fungicide available, and no matter at what concentration it is applied, no burning will occur.

If an excess of lime water has been added, it does not damage the foliage, but merely reduces the fungicidal value and the adhesive qualities of the mixture.*

It is not my intention here to mention Eau Celeste—a useful spray, but in no way superior to Bordeaux mixture.

DUST SPRAYS.

A great number of these mixtures have been advocated. Most of them contain blue vitriol mixed with inert powdered substances, and sometimes sulphur is added to render them effective against oidium also. In general the adherence of these compounds is not equal to the "liquid sprays," and many of them are carried off by the first wind or rain—often scorching the foliage at the same time. They possess no outstanding quality which warrants advising their use.

COMMERCIAL SUBSTITUTES FOR BORDEAUX MIXTURE.

In the hands of a novice, some of these preparations, which before use simply need the addition of water, may give satisfaction, and when only a few gallons of spray are required they may save much time and trouble; but when working on a commercial scale, nothing will prove more efficient, adherent, and less costly than Bordeaux mixture, correctly made on the spot by a man who understands the operation.

I cannot close this brief article without recommending the reader who desires to make a more detailed study of this fungus to turn to Mr. Francois de Castella's excellent article, which he published in the *Victorian Journal of Agriculture* some years ago, and will conclude by repeating his final words of advice:—

"Forewarned is forearmed: to ignore this menace is courting disaster. Though visitations such as would necessitate the almost weekly sprayings sometimes needed in France are not to be feared here, the disease may do harm in a wet summer. That spray protection will prove much more efficient here than in France can confidently be promised. It is hoped, therefore, that growers will familiarise themselves with the usual methods of treatment outlined above, keep a sharp look out for the first appearance of the disease, and, above all, make arrangements to secure without delay, should occasion arise, the necessary outfit and materials."

*The above statement is accounted for in the following manner. The lime water Ca(OH)_2 , in contact with the atmosphere changes to limestone (CaCO_3): some of it drops off the foliage, carrying with it other portions of the solidified spray. Whilst this change is going on, the fungicidal value of the mixture is reduced owing to the acid gases produced by the leaf going towards the neutralisation of the lime salt, instead of rendering minute quantities of the copper salt soluble. This change, fortunately, is completed fairly rapidly.

NARACORTE AND KYBYBOLITE BRANCHES OF THE AGRICULTURAL BUREAU.

EIGHTH ANNUAL FARM COMPETITIONS.

Conducted under the following Committee of Management:—
Messrs. S. H. Schinckel, F. A. Holmes, J. Donoghue, J. M. Wray, A. B. Feuerherdt, E. S. Alcock (Naracorte Branch), L. S. Davie (chairman), A. Bradley, S. Shepherd, H. B. Schinckel, and L. J. Cook (Hon. Secretary) (Kybybolite Branch).

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

For the eighth consecutive year a committee composed of members of the Naracorte and Kybybolite Branches of the Agricultural Bureau has conducted farm competitions for residents of the two districts, and, with the exception of the classes for the best worked and managed farms, these competitions have created a great deal of interest, and have been fairly well supported.

CONDITIONS.

The following conditions were laid down to govern the competitions:—

1. The competitions shall be open to all persons farming or residing within the radius of the boundaries of the District Council of Naracorte.
2. Entries in writing, and accompanied by necessary fee, must be lodged with the Hon. Secretary of Farm Competitions, Kybybolite, not later than the Saturday following the Naracorte P. & A. Society's 1923 Show, for all classes except Nos. 1 and 7, entries for which close on September 1st, 1923.
3. All entries to be made in the name or names of the *bona fide* owners of the property entered for competition.
4. The judging will take place about the middle of November, 1923, for all classes excepting sheep, which will be judged in the wool, as soon as possible after the entries close, and the decision of the judges shall be final.
5. Competitors will be required to accompany the judges, and, if necessary, also drive them round the property entered for competition, and also to answer any questions bearing upon the same, which may be put to them by the judge.
6. Where share farmers compete the person who does the work receives the prize.
7. No third prize will be allotted unless four entries are received for a class, and no second prize will be allotted unless three entries are received.

CLASS I.—BEST WORKED AND MANAGED FARM.

First prize, cup or trophy, valued £10 10s. (including £5 5s. presented by L. DeGaris, Esq.), to be competed for and won three times by the same competitor, each winner's name to be engraved on the trophy. Second prize, £3 3s. (presented by Cresco Fertilizers, Limited). Third prize, £1 1s. Yearly entrance, 5s.

The judging for the best worked and managed farm will be done by the point system, from a commercial point of view, and to the following standard:—

1. System of cropping, including cultivation, rotations, manures, growing crops, summer crops, and fallow	100
2. Most profitable class of stock on farm, advantage being given to breeders (horses, sheep, cattle, pigs, and poultry)	100
3. Implements and machinery suitable for the farm	40
4. The general care of implements, harness, and farm equipment . .	25
5. System of boundary and divisional fencing, including gates, sheep, horse, and cattle yards	40
6. System for conveying surplus surface water from the farm land .	15
7. The provisions for fodders	40
8. Watering stock and water supply	40
9. Time and labor saving appliances and methods	40
10. Arrangements of dwellings and outbuildings	25
11. Plan and upkeep of orchard, vegetable, and flower gardens, and other plantings for beautifying the homestead	20
12. Afforestation or shelter breaks	50
13. Experimental work of any kind conducted	15
14. Discretionary points allowed by judge	50
Total	550

No entries received this year.

CLASS II.—MOST IMPROVED AREA OF PASTURE.

First prize, half a ton ground rock phosphate (presented by Arthur H. Hassell, Esq.). Second prize, £1 1s. (presented by S. Shepherd, Esq.). Third prize, 10s. 6d. (presented by F. A. Holmes, Esq.). Entrance fee, 2s. 6d.

The difficulty of judging the entries in this competition is to place a correct value on the improvement made on the "natural pasture," because the soil types of the district vary between fairly wide limits, but the following scale of points answers the purpose fairly well:—

1. *Quantity of feed in pasture* will always be of the greatest importance, and so 35 per cent. of the marks were allowed for this.

2. *Type of plants present* is of consequence, because although many plants are eaten by livestock, some are of much higher feeding value than are others, and so 15 per cent. of the marks are allotted here.

3. *Quality of feed* has much to do with the value of any pasture, for luxuriant, over-rank plants have much lower palatability and feeding value than smaller plants of the same kind, and the presence of certain plants lowers the feeding value of other more useful kinds, so 10 per cent. of the marks are used for this.

4 and 5. *Freedom from useless plants and general care of pasture* have each been allotted 5 per cent. of the total marks.

6. *Improvement to natural pasture* is very difficult to arrive at, because (a) some types of soil exist in comparatively small patches surrounded by large areas of a very different kind of soil; (b) all fields of some farms have been cultivated and cropped with dressings of fertilisers for long periods of time, with the inevitable destruction of all "natural pastures" for comparison purposes, but for the purpose 25 per cent. of the marks were allowed.

7. *Area of pasture submitted* has been allotted 5 per cent. of the marks, because it is more creditable, and at the same time more difficult, to improve a large area than a small one.

The nine pastures submitted for judging have been given the following points:—

Name and Address.	Quantity of Feed.	Type of Plants.	Quality of Feed.	Freedom from useless Plants.	General Care.	Improvement to Natural Pasture.	Area of Block.	Total.
	35	15	10	5	5	25	5	100
E. C. H. Schinckel, Kybybolite	32	13	9	4	5	20	3	86
S. Shepherd, Kybybolite	27	12	8	4	4	20	3	78
S. Shepherd, Kybybolite	22	11	8	4	4	18	5	72
J. M. Wray, Hynam	28	8	6	4	4	17	1	68
E. C. H. Schinckel, Kybybolite	21	10	7	3	3	19	4	67
H. B. Schinckel, Kybybolite	23	8	7	4	4	18	2	66
E. C. H. Schinckel, Kybybolite	20	9	7	3	3	19	4	65
J. M. Wray, Hynam	18	9	6	3	3	21	4	64
E. C. H. Schinckel, Kybybolite	19	9	6	3	3	18	2	60

THE PASTURES EXHIBITED IN CLASS II.

1. *Mr. E. C. H. Schinckel* (10 acres).—This field was seeded with subterranean clover in 1920 at the rate of 1lb. seed per acre with 1ewt. superphosphate (36 per cent.). In 1921 it received a dressing of 1ewt. superphosphate (36 per cent.) per acre; a 1ewt. dressing per acre of 45 per cent. superphosphate in 1922; and 187lbs. of 45 per cent. superphosphate per acre this year, and at the time of judging was a dense mass of growth about 1ft. to 15in. high. There was little to be seen in the block except healthy and luxuriant subterranean clover, but the few weak patches showed a little silver grass, cape weed, sorrel, and brome grass. A first-class pasture, well cared for in the matters of fertiliser and the absence of obnoxious plants, and on the whole a great credit to Mr. Schinckel.

2. *Mr. S. Shepherd* (11 acres).—Subterranean clover was seeded in this field in 1917, and the pasture has been manured at various times since then, and this year received a dressing of 1ewt. superphosphate per acre. The whole block is very well covered with subterranean clover, and at the time of inspection this fodder averaged about 9in. in height; on one portion of the field, which had received more phosphate fertiliser than the bulk of the land, the clover was a full 12in. high, and very thick and dense. Quite an appreciable amount of sorrel was in evidence, and some hop clover, brome grass, and hair grass. A very good pasture field, which should further improve next year if a liberal application of superphosphate is given in the autumn.

3. *Mr. S. Shepherd* (67 acres).—This field of Mr. Shepherd's is also well covered with subterranean clover, but does not carry such

luxuriant growth as the smaller one already dealt with. Other than the subterranean clover, the plants sufficiently plentiful to be readily noticed were cape weed, hop clover, brome grass, hair grass, and some sorrel. This field will show still further improvement by the clover growth becoming more regular after more phosphates have been applied.

4. *Mr. J. M. Wray* (2½ acres).—This field received a dressing of lime in 1918, at the rate of 16½ cwt. per acre; in 1922 a little Wimmera rye grass seed was scattered over the land, and this year 150 lbs. superphosphate was distributed to the acre. At the time of judging very little rye grass was to be seen, but the whole field carried a dense mass of cluster clover, hop clover, and brome grass, with just a sprinkling of subterranean clover, the growth averaging over the whole field, about 1 ft. in height. Although the main plants present are not of such high feeding value as is subterranean clover, they are far from poor fodders when their growth has been encouraged by applications of phosphates and lime, and the plot was almost free of useless plants, with the exception of some slender thistles. This is a block of land rather better than most of the areas submitted in this class, and so fewer points were given for "improvement," but it is an extremely good pasture of naturalised fodder plants.

5. *Mr. E. C. H. Schinckel* (45 acres).—This field was cropped with a cereal in 1920 with 1 cwt. superphosphate per acre, and at the same time 1 lb. of subterranean clover seed was distributed to the acre. This year an application of 1 cwt. superphosphate (45 per cent.) to the acre was given to the whole field after the land had been ploughed up. Although the subterranean clover was a bit patchy, on the whole it was very fair, and in many places had made quite strong growth. Where the clover was thin or absent quite a lot of water grass (*juncus*), sorrel, and silver grass was present, all of which are very poor fodders. This field will be much improved by heavily harrowing the land in March or early April to spread the clover seed on to the unoccupied patches, and by again dressing it with phosphate at about this time.

6. *Mr. H. B. Schinckel* (4 acres).—In 1921 this field, which had not been seeded with any pasture plants, was dressed with 90 lbs. superphosphate per acre, and in 1923 received a further application of 1 cwt. superphosphate per acre. At the time of inspection the pasture consisted of a fairly thick mass of wild oats, wallaby grass, hop clover, cluster clover, and woolly clover, and averaged about 6 in. high. Although these fodder plants are not wonderfully good ones, except of course the wallaby grass, they are all very useful fodders, and there were few useless plants to be seen in the field. The land of which the block is composed is comparatively good, and should grow quite a number of the European fodders really well with much advantage to the owner.

7. *Mr. E. C. H. Schinckel* (32 acres).—A cereal crop was sown on this field in 1921 with 1 cwt. superphosphate (36 per cent.) per acre, and at the same time ½ lb. of subterranean clover seed was distributed to

the acre, and in 1923 1 cwt. superphosphate (45 per cent.) was applied to the acre. The subterranean clover in this block was rather patchy at the time of judging, and as well as quite a fair quantity of the ordinary weeds of the district, there was a lot of plants of a small white daisy, and being a "wet" field, much water grass (*juncus*). This pasture shows very clearly the value of phosphatic fertilisers for improving the growth of plants in the Kybybolite district, because of the fact that at the time of distributing the 1 cwt. dressing of superphosphate many patches of land were too boggy for horses to walk on, and on these patches no phosphate was applied, with the result that very few useful fodders grew on them, whereas everywhere the superphosphate was put, a fairly luxuriant growth of subterranean clover, cluster clover, or hop clover was produced.

8. *Mr. J. M. Wray* (40 acres).—This block was seeded with 11 lb. of subterranean clover per acre in May, 1920, and was dressed with 150 lbs. of superphosphate (45 per cent.) per acre in 1923. At the time of inspection this plot showed evidences of having carried many livestock, yet quite half of the land was well covered with healthy and strong plants of subterranean clover, the remainder being rather thinly covered with poor plants of brome grass, hop clover, and woolly clover. The very poor soil of this field produced little grazing before being seeded down and manured, and the improvement wrought has been very great. This will be still further improved if the land is well harrowed in the autumn, before the first rain, to spread the clover seed over the patches not yet covered, and also receives a further application of superphosphate.

9. *Mr. E. C. H. Schinckel* (8 acres).—This field has not been seeded with pasture plants, but a portion of it was dressed with farmyard manure, and in June, 1923, the whole block received a dressing of 1 cwt. superphosphate (45 per cent.) per acre. When the farmyard manure was added, it carried seeds of subterranean clover, and so started this fodder on the field, and at the time of judging, this portion was very well covered with clover, despite the fact that the field had been heavily stocked during the year. The remainder of the block contained much sorrel and bartsia, and some cape weed, silver grass, and hop clover.

CLASS III.—BEST GROWING CROP OF WHEAT.

East of Naracoorte Range. Area at least one-fifth of total area of wheat sown on the farm, but not less than 25 acres. First prize, 1 ton agricultural lime (presented by Messrs. A. James & Son). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

From a farmer's point of view, the main consideration in wheat-growing is to produce crops returning the greatest amount of grain per acre, and to get the full market price for the grain when harvested, and in judging wheat crops these requirements must have first place. On this plan the apparent yield will be the most important subdivision, and must carry the most of the points to be allotted, and, as diseases are the main cause of decreased prices, freedom from them will be next in order of importance, and added to these subdivisions must be others showing trueness to type and freedom from weeds.

The three crops submitted for judging have been given the following points:—

Name and Address.	Variety.	Apparent	Freedom from	Trueness to	Freedom from	Total
		Yield.	Disease.	Type.	Weeds.	
		60	20	10	10	100
C. W. Bray, Naracoorte	Federation	46	16	9	8	79
Kidman & Garnett, Laurie Park . .	Federation	40	18	9	7	74
Kidman & Garnett, Laurie Park . .	Federation	34	18	9	8	69

THE CROPS EXHIBITED IN CLASS III.

1. *Mr. C. W. Bray* (Federation).—This crop was rather irregular, some portions being really good, whilst others were quite light, these variations being caused by the excessive wetness of the season, and the presence of “take-all” further increased the patchiness. Of other diseases “loose smut” was the only one much in evidence. Although the crop was fairly free from weeds, juncus, silver grass, hop clover, and eape weed were noticeable.

2. *Messrs. Kidman & Garnett* (Federation).—This crop, grown on fallow, was thin and patchy, with good growth on the rises. Although free from bad diseases, it was far from clean, showing a lot of water grass (juncus) and thistles, and some of most of the ordinary weeds of the district.

3. *Messrs. Kidman & Garnett* (Federation).—Although this crop was grown on stubble land it was freer from weeds than the preceding one, yet it contained a fair sprinkling of silver grass, thistles, and the ordinary weeds of the district. At the time of inspection, the crop was very green, and was just breaking into head, but being thin and patchy could not possibly make a very heavy crop.

CLASS IV.—BEST GROWING CROP OF WHEAT.

West of Naracoorte Range. Area at least one-fifth total area of wheat sown on farm, but not less than 25 acres. First prize, $\frac{1}{2}$ ton Top Special High-Grade Super (presented by the Adelaide Chemical and Fertilizer Co., Ltd.). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

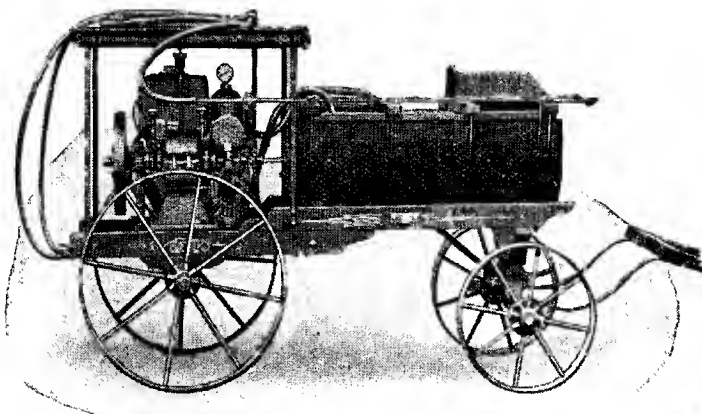
Under the same system of allotting points as for Class III., the three crops submitted in Class IV. were placed as follows:—

Name and Address.	Variety.	Apparent	Freedom from	Trueness to	Freedom from	Total
		Yield.	Disease.	Type.	Weeds.	
		60	20	10	10	100
A. L. Johnson, Naracoorte	Currawa	47	18	9	9	83
J. Neagle, Naracoorte	Currawa	41	16	9	7	73
T. H. Williams, Leobaher	Major Vandilla King . .	28	18	9	4	59

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THE CROPS EXHIBITED IN CLASS IV.

1. *Mr. A. L. Johnson* (Currawa).—This crop was very green, and only just breaking into head, but in such an excessively wet season, the late seeding suited the crop, and although a little on the light side, was nice and regular. A little melilot, sheep weed, canary grass, and barley were in evidence, but on the whole the crop was fairly clean.

2. *Mr. James Neagle* (Currawa).—Parts of this crop were really good, but it was patchy and irregular. Too many weeds were present, those most in evidence being sheep weed, hoary cress, melilot, canary grass, and wild oats. Quite an appreciable amount of loose smut was present.

3. *Mr. J. H. Williams* (Major and Yandilla King).—This crop was very dirty, and about half the plants present were weeds, consisting mainly of poppies, wild oats, brome grass, silver grass, sheep weed, and slender thistle.

CLASS V.—BEST GROWING CROP OF OATS.

East of Naracoorte Range. Area at least one-fifth of total area of oats sown on farm, but not less than 25 acres. First prize, 1 ton agricultural shell (presented by the Bonny Shell Co.). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

Oat crops, from a grower's point of view, must produce heavy yields of grain or hay, and stand up well enough to be harvested without a great deal of trouble, and from the buyer's viewpoint must be free from bad weeds and diseases, and so the judging of these crops has been done on these lines, giving most points to the more important subdivision of probable yield.

This particular season did not prove to be a very suitable one for the oat crops of the Naracoorte district, and as a consequence only three crops were left in this class, and they have been marked as follows:—

Name and Address.	Variety.	Apparent	Freedom from	Trueness to	Freedom from	Standing.	Total.
		Yield.	Disease.	Type.	Weeds.		
		60	10	10	10	10	100
P. A. Laurie, Kybybolite . . .	Algerian . . .	39	8	10	7	10	74
H. B. Schinckel, Kybybolite . .	Algerian . . .	37	9	10	6	10	72
F. C. Watson, Hynam . . .	Algerian . . .	24	8	10	6	10	58

THE CROPS EXHIBITED IN CLASS V.

1. *Mr. P. A. Laurie*.—This was only a comparatively light crop, and as a consequence carried a fair number of weeds, consisting mainly of cape weed, hair grass, sorrel, and catchfly. A fair amount of loose smut was present.

2. *Mr. H. B. Schinckel*.—A thin, patchy crop, containing just a little loose smut, a lot of water grass (*juncus*), and some barley-saffron thistle, and slender thistle.

3. *Mr. J. C. Watson*.—A poor crop, being both thin and short, and containing the ordinary weeds of the district in plenty.

CLASS VI.—BEST GROWING CROP OF OATS.

West of Naracoorte Range. Area at least one-fifth of total area of oats sown on farm, but not less than 25 acres. First prize, $\frac{1}{2}$ ton high grade super, 45 per cent. (presented by Wallaroo-Mount Lyell Fertilisers, Ltd.). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

In Class VI. only two farmers submitted oat crops for competition, and these have been marked as follows:—

Name and Address.	Variety.	Apparent Yield.	Freedom from Disease.	Trueness to Type.	Freedom from Weeds.	Standing.	Total.
J. Neagle, Naracoorte	Algerian	60	10	10	10	10	100
A. L. Johnson, Naracoorte	Algerian	50	9	10	8	10	87
A. L. Johnson, Naracoorte	Algerian	33	9	10	6	10	68

THE CROPS EXHIBITED IN CLASS VI.

Mr. J. Neagle.—Although this crop was a bit patchy, most of it was fairly good, and with the exception of one corner, but comparatively few weeds were present. A few heads of barley were noticeable.

Mr. A. L. Johnson.—This was a fairly regular, light crop, and was fairly clean, except for sorrel and quite a lot of barley.

GENERAL RECOMMENDATIONS.

This is the fifth consecutive competition which I have judged in this locality, and, in reporting on the previous ones, attention was drawn to various matters likely to improve the farming practices of the district.

In the *Journal of Agriculture* for January, 1920, the following points were mentioned:—

1. The scarcity of pigs.
2. The advantages of dairying.
3. The need of good rotation crops.
4. Heavier manuring of crops to improve the stock-carrying capacity of the pastures in years following.
5. Correcting excessive acidity by applications of lime.
6. Drainage of surplus surface water.
7. The overstocking of pastures.
8. The excessive feeding off of crops.
9. Extending the areas under peas.

In the *Journal of Agriculture* for January, 1921, it was pointed out that the were still ample evidences that the above points held good, and the following improvements were enlarged upon:—

10. Improving pastures with subterranean clover.
11. Subdivision of holdings.
12. Summer crops.
13. Cultivation.
14. Varieties of crops.

In the *Journal of Agriculture* for February, 1922, these were again referred to, and the following further improvements were discussed in some detail:—

15. The presence of "take-all" in wheat crops.
16. The effects of superphosphate on pastures.
17. The presence of barley in crops.
18. Wimmera rye grass.

In the *Journal of Agriculture* for January, 1923, suggestions were made in connection with the following considerations:—

19. The great havoc being played with wheat crops by "take-all."
20. The small area under pea crops.
21. The need of converting many "crop-growing" farms into "live-stock" farms.

It was observed during this year's tour of inspection that exactly the same faults noticed for the last four years are still in evidence, and still call for improvement, but possibly the points of most importance, and requiring comment at the present time, are:—

22. *Top-dressing Pasture Lands.*—In this particular district the top-dressing of pastures has passed the experimental stage, and fairly considerable areas are now receiving applications of fertilisers. To date, dressings of phosphatic manures have given the greatest increases yet noted, and these improvements in grazing capacity have been so great that it was not at all unusual to hear of farmers who intend applying 1 cwt. superphosphate per acre to all of the land they are leaving out for pasture. One farmer, who has trebled the sheep-carrying capacity of his land by applying 1 bag of 45 per cent. superphosphate per acre, intends using this quantity on all of his large fields, and double that quantity on all small fields. Despite the very marked improvement made to pastures by fertilisers on so many farms in various parts of the district, there are still a great many landholders who have not realised the value of manuring their pastures. After discussing the advantages of top-dressing pastures with a large number of farmers who have been practising it for some few years now, it seems quite safe to make the assertion that in the Naracoorte and surrounding districts the application of the equivalent of 1 cwt. superphosphate per acre per year will at least double the sheep-carrying capacity of the land, and at the same time the land will carry the increased number in much healthier and better condition than now applies on the unmanured lands. That this is a remarkably good business proposition will be readily realised if we remember that unmanured land carrying livestock at the rate of one sheep per acre per year can be made to carry two sheep per acre per year at an extra annual cost of about 7s. per acre, that is at the present price of superphosphate. A good growth of pasture plants will annually utilise all of the phosphoric acid in 1 cwt. of superphosphate (36 per cent.) per acre, and so the land should at least receive that or its equivalent and very possibly the cheapest way to provide the required phosphoric acid would be by heavy dressings of phosphates at comparatively long periods, rather than 1 cwt. superphosphate per acre per year. At the present prices of phosphates, best money results would probably be secured by applying a mixture of 10 cwt. ground raw

rock phosphate (82 per cent.), and 1 cwt. superphosphate (45 per cent.) per acre, with the intention of not again manuring the land so treated for a period of 12 or 15 years.

23. *Seeding Land to Proved Pasture Plants.*—Although the climatic conditions of the Naracoorte district are very favorable to the growth of plants suitable for livestock, most of the soils do not produce really good grazing after clearing the timber, nor after cropping the land under the system at present practised. This appears to be largely due to the great deficiency of phosphoric acid in these soils, and, as has been pointed out above, a very great improvement in this direction follows reasonable applications of fertilisers containing this necessary plant food. In the typical ironstone soils of that part of the district east of the Naracoorte Range there are good patches of land which will carry more than one sheep per acre per year after killing the "natural" timber, and after cultivating the land and growing crops with the minimum of phosphates, sorrel, silver grass, and stunted brome grass occupy most of the land. When cropping is continued with dressings of phosphates, hop clover, woolly clover, and cluster clover gradually make their appearance, and the brome grass plants become stronger, which additions improve the grazing capacity of the land very considerably. When the time arrives that a fair amount of phosphate has been put into the soils, and when such land is shut up as pasture and adequately manured with phosphates, wallaby grass reappears, and with the three clovers (hop, woolly, and cluster) and the brome grass, will make thick pastures from 12 in. to 15 in. high, capable of carrying livestock at the rate of $1\frac{1}{2}$ to 2 sheep per acre per year. Now, with the exception of the wallaby grass, none of the abovementioned plants are really good grazing plants, and at least equal and possibly much better pastures can be produced in a shorter time by seeding the land to superior fodders. In this direction quite a number of farmers have proved the value of subterranean clover and Wimmera rye grass, and their introduction has proved a great benefit in every case where tried. Land seeded with a mixture of 10 lbs. of Wimmera rye grass seed and 2 lbs. of subterranean clover seed per acre, and receiving the equivalent of 1 cwt. superphosphate per acre per year, will carry much more livestock than the same land not so seeded, and has the added advantage that if allowed to become dry a pasture composed of these plants remains good feed, a fact which does not apply to many other fodder plants. Both of these plants make good pasture if seeded separately, in which case subterranean clover should be seeded at the rate of 3 lbs. or 4 lbs. per acre, and be grazed carefully during its first year, and 12 lbs. or 15 lbs. of Wimmera rye grass seed per acre are necessary properly to establish this grass.

24. *Greater Subdivision of Holdings.*—The Naracoorte district is essentially suited to the production of livestock, but full results from pastures cannot be secured unless much subdivision of holdings is done. Maximum yields from fodder crops are only secured when these crops are cut and carted off the land, and when such crops are grazed; this is the ideal to keep in view, and the nearer the grazing approaches

the cutting and carting off, the greater will be the returns. This, of course, can only be done by having small fields, crowding large numbers of livestock on them for short periods, then moving the stock on to the next field. In this district where water is obtained easily and cheaply there is no excuse for not subdividing well, and when sown pastures and adequate top-dressing of pastures are the rule 20-acre fields will not be too small.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during October.	Per Cow during October.	Per Cow August to October.	Per Herd during October.	Per Cow during October.	Per Cow August to October.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	18.25	13.84	9932.5	544.25	1358.84	384.83	21.09	50.72
2/B	8	8	8711	1088.87	2733.00	270.51	33.81	87.56
2/C	18	15.84	12273	681.83	1718.64	412.33	22.91	60.00
2/E	15	11.55	11045.5	736.37	1648.57	401.49	26.77	70.77
2/H	22	22	18491.5	866.67	1956.65	655.87	31.50	79.70
2/I	12.84	12.29	11091.5	863.82	1924.32	390.57	30.42	69.65
2/J	12	10.94	13064.5	1088.71	2522.60	542.06	45.17	98.08
2/K	21.61	18.35	15264.5	706.36	1736.84	552.80	25.58	63.49
2/L	25	21.42	12910.5	516.42	1088.97	540.82	21.63	45.65
2/O	34.29	29.81	22996	670.63	1621.87	873.49	25.47	60.35
2/R	16.16	16.16	19372.5	1198.79	3160.17	692.15	42.83	120.15
2/S	5	5	4278	855.60	2297.60	177.69	35.54	100.15
2/T	11	10.61	10158	923.45	2400.63	359.63	32.69	90.57
2/U	16.68	14.45	16937.5	1015.44	2304.07	684.11	41.01	87.25
2/V	16.10	14.76	7874	489.07	1235.13	294.38	18.28	49.10
2/W	14.55	14.45	14101.5	969.17	2778.81	505.38	34.73	94.01
2/X	27.10	25.26	27200.5	1003.71	2229.76	876.71	32.35	75.91
2/Y	11	10.55	11218.5	1019.86	2470.77	414.81	37.71	95.81
2/Z	13.58	13.58	10110	744.48	2091.96	390.34	28.74	80.05
2/AA	24	22.61	18429.5	767.90	1721.74	664.31	27.08	62.46
2/BB	9	9	5750.5	638.94	1667.88	195.85	21.76	57.74
2/CC	12.39	11.90	7508.5	606.01	1494.51	284.97	23.00	57.94
Means	16.53	15.11	13123.61	794.17	1902.29	480.23	29.06	70.54

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during November.	Per Cow during November.	Per Cow August to November.	Per Herd during November.	Per Cow during November.	Per Cow August to November.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2 A	17	15	12,645	743.82	2,102.66	486.26	28.60	79.32
2 B	8	8	7,515	939.37	3,672.37	248.04	31.01	118.57
2 C	18	14.83	11,068.5	614.92	2,333.56	397.81	22.10	82.10
2 E	15	14.63	13,170	878.00	2,526.57	500.48	33.37	104.14
2 H	21.03	22.30	16,990.5	807.92	2,764.57	643.48	30.59	101.29
2 I	14	14.30	12,804	914.57	2,838.89	405.70	33.26	102.91
2 J	12	12	12,465	1,038.75	3,561.35	497.59	41.47	139.55
2 K	23.50	20.60	17,045	725.32	2,462.16	584.39	24.87	88.36
2 L	25	20.90	12,607	504.28	1,593.25	520.54	20.82	66.47
2 O	34.83	32.10	21,280	610.97	2,232.84	777.95	22.34	82.09
2 R	15.20	15.20	17,229	1,133.49	4,293.66	703.47	46.28	166.43
2 S	5.33	4.80	4,611	865.10	3,162.70	239.10	44.86	145.61
2 T	12	10.90	11,013	848.04	3,248.67	373.67	29.76	120.33
2 U	17	16.80	18,501	1,088.29	3,392.36	697.07	41.00	128.25
2 V	18.10	17.87	12,034.5	664.89	1,900.02	457.24	25.26	74.36
2 W	17.23	17.23	18,492.5	1,073.27	3,852.08	678.56	39.38	133.39
2 X	29.50	28.50	28,066.5	951.40	3,181.16	1,000.17	33.90	108.91
2 Y	11.87	10.87	9,845	829.40	3,300.17	369.99	31.17	126.98
2 Z	12.63	10.67	7,484.5	592.59	2,684.55	293.58	23.24	103.32
2 AA	24	24	16,965	706.87	2,428.61	613.57	25.57	88.03
2 BB	9	9	6,270	696.67	2,364.55	227.77	25.31	83.05
2 CC	13	13	7,815	601.15	2,095.66	324.98	25.00	82.94
Means	16.96	16.07	13,450.77	792.88	2,697.40	504.61	29.74	100.36

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GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1923.

Herd No.	Average Cows in Herd.	Average Cows in Milk.	Milk.		Butterfat.	
			Per Herd during October.	Per Cow during October.	Per Herd during October.	Per Cow during October.
			Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	12-03	13166	774-37	484-71	28-51
3/B	14	9-23	4228-5	302-04	154-22	11-02
3/C	12	11-39	10004	833-64	353-56	29-88
3/D	12	7-03	4951-5	412-63	171-66	14-31
3/M	10	10	6200	620-00	226-18	22-62
3/G	10	8-87	7910	791-00	274-54	27-45
3/F	8	8	5363	670-37	196-26	24-63
3/H	14-65	12-65	7541	514-74	224-71	15-34
3/I	12	11-23	7050	587-50	269-74	22-48
3/J	13-68	12-68	5004-5	365-83	200-75	14-67
3/K	25	20-71	17167-5	688-70	654-29	26-17
3/L	18	17	10733	598-28	298-75	16-60
3/E	15-29	12-84	9016	589-66	359-99	23-54
3/N	20	17-55	11672-5	583-63	419-05	20-93
3/O	16	9	5518	344-87	190-38	11-96
3/P	14	12-13	9687	691-93	351-50	25-11
3/Q	61	51-48	38273	627-43	1426-55	23-39
3/R	17	17	14105	829-71	571-53	33-62
Means	17-20	14-49	10421-69	605-87	379-63	22-07

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during November.	Per Cow during November.	Per Cow October to November.	Per Herd during November.	Per Cow during November.	Per Cow October to November.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	13-90	17,200-5	1,011-78	1,786-25	710-16	41-77	76-28
3/B	15-67	13-53	7,583-5	483-95	785-99	316-44	20-19	31-21
3/C	12	12	11,160	930-00	1,763-64	436-54	36-38	66-26
3/E	16	14-32	11,450	715-63	1,305-29	452-31	28-27	51-81
3/F	8	8	6,015	751-88	1,422-25	209-49	26-19	50-72
3/G	10	9	8,100	810-00	1,601-00	267-78	26-78	54-23
3/H	14	12-60	9,279	662-78	1,177-52	331-82	23-70	39-64
3/I	12	12	8,790	732-50	1,320-00	328-79	27-40	49-58
3/J	14	13	6,000	428-57	794-40	265-33	18-95	33-02
3/K	25	23-17	20,252-5	810-10	1,496-80	749-09	29-96	56-12
3/L	18	18	11,610	645-00	1,241-28	431-52	23-97	40-57
3/M	12-10	12-10	7,974	664-29	1,267-29	317-06	25-76	48-38
3/N	20	18	11,805	590-25	1,173-88	472-52	23-63	44-55
3/O	16	12-37	9,950	621-88	966-75	337-80	21-11	33-01
3/P	14	14	10,740	767-14	1,459-07	391-98	28-00	53-11
3/Q	61	59	47,985	786-64	1,414-07	1,847-70	30-29	53-65
3/R	17	17	14,115	830-29	1,660-00	589-50	34-68	68-36
3/D	12	7-40	5,355	446-25	858-88	199-18	16-60	20-91
Means	17-43	16-08	12,520-25	718-25	1,324-86	480-84	27-58	49-66

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during November.	Per Cow during November.	Per Cow October to November.	Per Herd during November.	Per Cow during November.	Per Cow October to November.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1 C.	32	26.43	22,563	750.81	1,645.39	738.17	24.61	59.90
1 J.	20.07	16.67	8,449	420.98	10,327.72	388.31	19.35	47.26
1 L.	19	18.23	14,613	769.11	1,555.19	597.52	31.45	65.95
1 M.	21	14.27	8,201	390.52	743.85	414.64	19.74	38.76
1 R.	10.80	15.90	9,916.5	590.46	1,197.28	483.34	28.77	56.49
1 T.	14	10.23	6,657	475.50	1,041.10	337.98	24.14	54.58
1 W.	17.87	16	9,438	528.10	1,149.93	359.43	20.11	44.38
1 X.			Withdrawn from Association.					
1 Y.	19	15.87	11,544	607.58	1,320.60	554.16	29.17	62.22
1 Z.	21	18.47	12,377.5	589.38	1,274.76	614.69	29.27	60.64
1 Aa.			Withdrawn from Association.					
1 Ca.	21.77	20.40	11,916.5	547.38	1,150.59	483.36	22.20	48.04
1 Da.	20	20	13,455	672.75	1,356.10	579.33	28.97	59.33
1 Ea.	10	9.67	7,398	739.80	1,355.15	341.44	34.14	63.35
1 Fa.	12	12	9,285	773.75	1,573.29	397.36	33.11	67.33
1 Ga.	8	8	6,435	804.38	1,506.69	297.50	37.23	70.60
1 Ha.	12.37	12.17	10,589	904.91	1,491.48	441.15	37.72	62.42
1 Ia.	13	13	9,315	716.54	1,380.35	384.31	29.56	56.90
1 Ja.	15	10.83	7,935	529.00	1,006.13	341.97	22.80	43.51
1 Ka.	14	9.53	7,758	554.14	980.39	359.78	25.70	45.57
1 La.	9	9	5,160	573.33	1,165.77	253.74	28.19	57.32
1 Ma.	16	16	9,915	619.69	1,208.47	453.13	28.32	55.28
Means	16.59	14.63	10,146.03	611.43	1,259.24	444.08	26.59	55.34

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"TAKE-ALL" INVESTIGATIONS.

The serious nature of the take-all disease of wheat in the newer wheat-growing areas of South Australia has led to arrangements being made with the Department of Agriculture for an extended investigation of the disease at the Laboratory for Plant Pathology at the University, in order to discover the best methods of control for this pest. It is very generally recognised that the disease does most harm in the more recently opened up mallee districts, and as the district around Pinnaroo is one which suffers perhaps more than any other, this was visited early in November by the Lecturer in Plant Pathology (Mr. Geoffrey Samuel, B.Sc.), in order to see the disease in the field, and obtain specimens with which to work in the laboratory. Through the courtesy of the local Branch of the Agricultural Bureau, which provided transport facilities, it was possible to visit a large number of farms and collect many samples. In a preliminary progress report on these investigations, Mr. Samuel says:—"It is well-known now that the take-all disease is caused by a minute parasitic fungus, which enters the roots of healthy wheat plants and feeds on the tissues of the roots and the bases of the stems, so that the wheat plant sooner or later dies. The black discoloration at the base of infected plants is due to this minute parasitic fungus, but the fungus itself is so small that its form can only be distinguished with the aid of a microscope.

Lines of Investigation.

There are two lines upon which an investigation of this disease must proceed at the commencement, but as the work progresses these should eventually supplement one another completely. In the first place, the parasite which causes the disease in the wheat must be isolated in the scientific laboratory, and its life-habits studied with the microscope and by other means, so that we can understand exactly how and when it attacks the wheat plant, and can judge and experiment with the best methods and time for killing it. In the second place, careful observation and study of the occurrence of the disease in the field may be expected to indicate useful methods of controlling it; for on visiting a take-all infected district it is immediately evident that all crops are not equally infected. Crops on exactly similar soil, with similar rainfall and climatic conditions, may be affected to a very different extent during the same season, while the degree of infection may vary from year to year on the same land. It is thus evident that by studying the history of land carrying healthy crops as well as of land carrying diseased crops, facts may be brought to light indicating which treatment of the land, and system of manuring, tends to check the disease, and which to favor it.

Both these lines of investigation will be followed up in the work being done on take-all. The investigation of the parasitic fungus in the laboratory has already commenced, but this part of the work requires careful study and a long time to complete. On the other

hand, the observations made on the crops at Pinnaroo indicate possibilities of a much better control of the disease by attention to certain cultural methods. Some account of these observations is here given.

FIELD OBSERVATIONS.

From a review of the crops inspected the following statements are found to apply in the majority of cases:—The crops which suffered most from take-all were those following grasslands: if there had been a year of fallow the attack was not so bad; and if the grass land had been burnt before fallowing the crops were still better than in the previous case.

These facts immediately suggest that grassland is a carrier of the take-all disease; and so specimens of grasses from pasture-land were taken for examination. Of 14 different kinds of grasses examined, only two have so far been found to be affected by the take-all disease. These are barley grass and silver grass, unfortunately, the two dominant grasses in the pasture. Of these, silver grass is very rarely infected, and then only slightly; whereas barley grass is very badly attacked over a wide area. In many pastures near Pinnaroo, it is difficult to find any parts free from take-all-infected barley grass. This, then, is probably the explanation of the badly infected crops when grass land is ploughed in just before sowing. The take-all fungus can live for some time in the soil on any pieces of ploughed-in grass or stubble, so that when barley grass pasture is ploughed in before seeding, there may be take-all practically all over the field ready to attack the young seedlings. Barley grass on the fallows also may act as a carrier of take-all, which fact shows the great importance of keeping the fallows clean.

GRASS LAND INFECTION.

This bad take-all infection on barley grass raises the question whether it would not be better to try to cut grassland out of the rotation in the Pinnaroo area for some years. A rotation such as wheat-oats-bare fallow, or even wheat-oats-oats-bare fallow, might do much to check the disease. If necessary for stock, permanent pasture might be established, perhaps with a better grass than barley grass.

Burning the grassland or the stubble is beneficial. This was evident from comparison of crops sown on burnt and unburnt land; but is what might be expected, for the take-all fungus is killed by burning. The stronger the burn the greater the number of disease germs killed. It is not yet certain whether a very strong burn can kill *all* the fungus, but this is unlikely, for the fungus goes some distance down into the soil on the roots of diseased plants.

Another advantage in a burn is that there is not a quantity of dead wheat or grass to be ploughed in on which the fungus can grow. Then, if the fallows are kept clear of all grasses by good cultivation, much of the fungus in the soil germinates with the rains, and, finding no wheat or grass to grow on, eventually dies from starvation. The more frequent the cultivation the more completely the fungus can be got rid of. (This recommendation for burning only applies, of course, where take-all has been in the field. When the field is clean, and free from take-all, there are many advantages in ploughing in stubble.)

There is one other helpful practice which has frequently been emphasized by Mr. Spafford, that is, rolling. When thorough cultivation has made a good even seed-bed this is not so necessary; but where it has not been possible to cultivate sufficiently, and it is suspected that the seed-bed and the soil below are not properly compacted, rolling is said to have a very beneficial effect.

EARLY VARIETIES AND MORE MANURE.

Further, it was noticed that in the majority of cases the early wheats were not so badly attacked as the late varieties. No definite explanation can at present be offered for this. More work in the laboratory and in the field on time of infection, stages of infection, temperature for infection, etc., may give the correct explanation later on. This observation could be utilized to some extent even now, however, by sowing early varieties in preference to late on land which is still suspected to contain the take-all disease.

The use of heavy dressings of superphosphate has been found largely to control take-all on the West Coast, but no comparison could be made between heavily and lightly dressed crops at Pinnaroo, because 60-90lbs. was the average dressing used on practically all farms. One farmer, however, had sowed a strip with 2cwts. super., alongside ones with 90lbs. and 56lbs. The strip which had received 2cwts. was certainly free from take-all, but the one with 90lbs. was also almost free; there was more take-all on the 56lbs. strip. This single experiment is not sufficient to justify the formation of a definite opinion on the effect of different dressings of super on the take-all disease in Pinnaroo soils. It is hoped to carry out more extensive experiments on manurial treatments next year.

THE STATE OF THE SOIL.

A question which may now be raised in connection with the greater prevalence of take-all in recently opened up mallee lands is this:—It is due to some factor in the soil, and if so, what? Is there something more than the abundance of take-all infected barley grass at Pinnaroo, which may help to account for the greater susceptibility of this land to take-all.

Some work done by R. S. Kirby, on the take-all fungus in America suggests a line of investigation of this. Kirby finds that the fungus grows best on substances with an alkaline reaction, and that substances with an acid reaction tend to stop the growth of the fungus. May it be, then, that the soil solution in Pinnaroo soils is more alkaline. (This does not refer to the absolute alkalinity, or lime-content, of the soil, but to the reaction of the soil solution, than in areas where take-all is less destructive, and that this to some extent explains its greater severity at Pinnaroo.)

In this connection it is interesting to recall the history of the Lower Northern areas and of Yorke's Peninsula. It is well-known that take-all was formerly very prevalent in both these areas, but now occurs only rarely. Is this to be explained by improvement in cultivation methods, or by some increase in the acidity of the soil, or perhaps by both acting together? It is known from experience in other parts of the world that alkaline soils, when brought into cultivation, become



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generally less alkaline owing to the ploughing in of plant remains and the consequent formation of humic acid. No figures as to the reaction of the agricultural soils of South Australia are available, however, a fact which emphasizes once again the need for a soil survey of this State. In order to test the above question, therefore, soil samples were taken at Pinnaroo, and these will be compared with samples from other areas. The details of these tests, and a discussion of their relation to take-all will be published in future numbers of the *Journal of Agriculture*, in the periodical progress reports of the investigations.

SUMMARY.

A brief summary of what is so far known of the control of take-all by cultivation may be given thus:—

Burn the stubble early after take-all.

Fallow early.

Keep the fallows clean, especially from barley grass, by cultivating.

Cultivation also makes a better seed-bed.

Roll if the seed-bed is not well compacted.

Use more superphosphates (1 cwt. per acre is suggested for Pinnaroo until further experiments are made.)

Consider taking grasslands out of the rotation in bad take-all areas. Wheat-oats-bare fallow, or wheat-oats-oats-bare fallow are suggested.

Sow early wheats if take-all is still suspected to be in the land.

THE AGRICULTURAL OUTLOOK.

Boorabrook.—The weather for December has been extremely cool and wet, 25° points having been registered up to the time of writing. The crops are quite ripe and waiting to be taken off, and heavy yields are expected. Natural feed is plentiful. The stock are all in good condition. Pests—Numerous summer noxious weeds are making their appearance under very favorable conditions. Miscellaneous—Farmers have done little or no stripping of crops, owing to the continuous wet and cold weather.

Eyre Peninsula.—Weather—A considerable amount of thundery weather and several rainy days were experienced. A total of 157 points of rain fell during the month. Exceptionally bad harvesting weather has prevailed, with cool mornings, and so growers have only been able to reap during the mornings on very few occasions. Crops are standing up to the weather exceptionally well, except Early Glugas and King's, which have lodged badly. Crops in district have yielded 33 bush. per acre. A week of decent weather would enable farmers to complete harvesting. Fruit crop is very disappointing, there being a poor setting of nearly all fruits. Natural feed is showing up green again since the rains, and will make it bad for burning should we get any more rain. Stock are all in good condition and free from disease. Pests—Rabbits are becoming numerous.

Turretfield.—Weather—This month has been wet beyond the average; 242 points of rain were registered, 96 points fell in one shower on December 17. Crops—Hay cutting is finished, but very little hay is carted, so far the bulk is stooked in the fields. Reaping has been started in barley, oat, and early wheat crops. Natural feed is mostly eaten out. Farmers will be glad of their stubbles as soon as available. Stock is in very good condition; fat sheep and lambs have been dis-
by
ted of. Pests—Starlings are numerous and doing some damage in the gardens
of th

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Ltd., reported on January 1st, 1924:—

BUTTER.—During the month production of all grades of butter kept up remarkably well, due to the late rains which prolonged the season. In the early part of the month fairly large shipments were made to interstate and oversea buyers, but towards the end of December a shortage of choicest quality was being felt, which accounted for an advance in values of top grades, whilst lower grades also advanced accordingly. Choicest factory and creamery fresh butter, in bulk, 1s. 7½d.; second grade bulk, 1s. 3d.; best separators and dairies, 1s. 5½d. to 1s. 7d.; fair quality, 1s. 4d. to 1s. 4½d.; store and collectors', 1s. 2½d. to 1s. 4d.; heated lots, 1s. 1d.

Eggs.—Fairly extensive quantities were marketed, and with local purchasers operating freely at each auction, all consignments submitted were readily cleared, values recording a slight fluctuation. Fresh hen, 10½d.; duck, 11½d. per dozen.

CHEESE.—The feature of this line has been the exceptionally brisk local demand. Although large quantities have been consigned from the South-Eastern factories, all available stocks have been disposed of at slightly better values than ruled during the previous month, the range being 1s. to 1s. 2d. for large to loaf.

HONEY.—Since our last report the market has advanced ½d. per lb. for now season's prime liquid, owing to the strong interstate inquiry. Prime clear extracted in liquid condition, 4½d. to 4¾d.; best candied lots, 3½d. to 3¾d.; lower grades, 2d. to 2½d.; beeswax realising for clear samples 1s. 4d. per lb.

ALMONDS.—As a result of local and interstate purchasers only operating on a small scale, values have receded ½d. per lb. as compared with our previous quotations. Branded, 9d. to 9½d.; mixed softshells, 8d. to 8½d.; hardshells, 4½d.; kernels in strong request at 1s. 5d. Walnuts, 1s.

BACON.—Excellent demand ruled for this line, supplies of middles and rolls being hardly equal to trade requirements. However, curers held ample stocks of sides and hams, for which a heavy call was experienced. Best factory-cured sides, 1s. 4d.; middles, 1s. 4½d. to 1s. 5d.; hams, 1s. 8d.; Hutton's "Pineapple" Brand hams, 1s. 9d. per lb.

LARD.—Hutton's "Pineapple" brand, in packets, 1s. 1d.; in bulk, 1s. per lb.

LIVE POULTRY.—At each sale we submitted an extensive catalogue, which met with good demand, buyers bidding keenly where quality was right, and all consignments realised satisfactory values, the only line not receiving the good attention of purchasers being birds of light breeds, prices for which receded so as to effect clearances. The Abattoirs' strike induced farmers to forward their surplus poultry earlier in the month, and it was felt by the trade that supplies would probably be short during Christmas week, but such was not the case, as we were forced to hold daily sales to cope with the very large quantities which came to hand. Crates obtainable on application. The following rates ruled at our last auction:—Prime roosters, 5s. to 7s. 6d. each; nice-condition cockerels, 3s. to 4s. 9d.; poor-condition cockerels, 2s. to 2s. 6d.; plump hens, 3s. 6d. to 5s.; medium hens, 2s. 9d. to 3s. 3d.; some pens of weedy sorts lower. Geese, 5s. 10d. to 8s. 6d.; ducks, good condition, 5s. to 8s.; do., fair condition, 3s. 6d. to 4s. 9d.; turkeys, good to prime condition, 1s. 2d. to 1s. 10d. per lb. live weight; do., fair condition, 11d. to 1s. 1d. per lb. live weight; do., fattening sorts lower. Pigeons, 6d. each.

POTATOES.—At the end of the month prices eased considerably, owing to the increased supplies obtainable from Victoria, and new Victorians are now realising 10s. 6d. to 11s. 6d. per cwt. on rails.

ONIONS.—Best quality white onions, at 9s. 6d. per cwt. on rails.

ANALYSES OF SAMPLES OF FERTILIZERS.

The following are the results of analyses made by the Government Agricultural Analyst (Mr. C. E. Chapman) of samples of fertilizers taken by Assistant Inspectors J. Hunter and J. B. Harris during the year ended December 31st, 1923:—

Reference.	Name of Firm and Fertilizer.	Phosphate.						Nitrogen.		Potash, K_2O .		Bone Manure, Fine Material.	
		Water Soluble.		Citric Soluble.		Acid Soluble.		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	%	%	%	%	%	%
1279	Adelaide Chemical & Fertilizer Co., Ltd.—												
1279	Top Special Super.	45.0	45.0	—	—	—	—	—	—	—	—	—	—
1280	Mineral Super.	36.0	36.3	—	—	—	—	—	—	—	—	—	—
1281	Guano Super.	27.0	28.7	3.0	3.0	3.0	4.8	—	—	—	—	—	—
1282	S.A. Super.	39.0	29.9	—	—	—	—	—	—	—	—	—	—
1283	Bone Dust	—	—	—	—	40.0	43.1	3.25	4.1	—	—	40.0	59.5
1284	Wheat Manure	28.0	29.9	5.0	6.2	3.0	5.9	1.05	1.0	—	—	—	—
1450	*Sulphate of Ammonia	—	—	—	—	—	—	20.0	20.1	—	—	—	—
1451	†Guano Super.	27.0	31.2	3.0	2.0	3.0	4.7	—	—	—	—	—	—
1452	‡Vine Manure	20.0	19.3	8.0	9.0	4.0	4.8	1.6	1.5	4.5	4.5	—	—

* Taken from Mr. Thindler & Co., Gawler.
 † Taken from Mr. T. J. Withmann, Gawler.
 ‡ Taken from "Argentine Fertilizers" Co-operative Society, Argentin.
 (Mrs. Quinlan, Chief Inspector of Fertilizers, &c.)

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, December 12th, there being present Mr. W. S. Kelly (Deputy Chairman), Capt. S. A. White, Col. Rowell, and Messrs. C. J. Tuckwell, A. M. Dawkins, F. Coleman, J. W. Sandford, W. G. Auld, and the Secretary (Mr. H. J. Finnis). Apologies were received from the Minister of Agriculture (Hon. J. Cowan M.L.C.), Professor Arthur J. Perkins, Messrs. H. Wicks, and W. J. Colebatch.

Crop and Fallow Competitions.—The Secretary of the Board reported that the Government had approved of a subsidy of £5 to the Miltale Branch in connection with the crop-growing competitions.

Conservation of Waters of Finnis and Angas Rivers.—The recent Conference of Southern Branches of the Agricultural Bureau resolved, "That the Government be requested to conserve the waters of the Finnis and Angas Rivers for Irrigation purposes". The matter was referred to the Minister of Irrigation, who reported that in view of the pressure of work by the Irrigation Commission the matter could not be considered at present.

Standardizing Spraying Compounds.—Congress of 1923 resolved—"That the Government be asked to fix a standard for all spraying compounds and that the manufacturers be requested to conform to same." The Horticultural Instructor (Mr. George Quinn), to whom the matter was referred has supplied the following report:—"I desire to report that the department has not been unmindful of the want which this resolution voices, because under the Insecticides Act, No. 613 of 1910, the fixing of standards for insecticides and fungicides was strongly stressed. A similar provision was contained in a Victorian Act passed with the object of standardizing these utilities. The Victorian Department of Agriculture attempted by carefully drafted regulations, to achieve this object, and kindly supplied copies of their regulations to this Branch when our Act of 1910 was passed. With the assistance of the Director of Chemistry (Dr. Hargreaves), I endeavoured to reduce the matter to exact expression covering a workable basis, but notwithstanding the great knowledge brought to bear by my collaborator we found ourselves hopelessly unable to evolve anything satisfactory. It was found when the great field of remedies and reagents was brought under review the task was a stupendous one. Of course, a few, like arsenate of lead, lime sulphur compounds, and sulphate of copper could be standardized, but most insecticides designed for a special purpose are compounds of a variable character compiled on empirical formulae, though perhaps each one is fairly effective if applied with proper consideration of all the circumstances. The principal defect in fixing a legally non-variable standard for an insecticide lies in the fact that such can only apply to one brand or name, and the vendor can withdraw his goods or cease manufacturing, and put out something of a similar mixture under another name, thus

leading those who try to accomplish the standardization around in a circle. It was the realisation of this which caused us to recommend the Act of 1910 to be repealed and substituted by another measure 'The Insecticides Act, No. 1377 of 1919,' which throws the onus on the vendor of fixing, registering, guaranteeing, and maintaining a standard of any insecticide, fungicide, or vermicide which he may offer for sale, just as is done with fertilisers under the Fertilisers Act. As this Act provides for the branding of every parcel sold with the guaranteed percentage of its constituents, and condition of such insecticidal ingredients, the purchaser would, if the law were enforced, be in a position to see whether he was receiving what he agreed to purchase. Further, the department under this later law has power to publicly expose in the press useless nostrums or spurious compounds put forward as insecticides, &c. No attempt has been made to enforce this law, notwithstanding that so far back as 23/8/21 representations were made to a former Minister pointing out that the desirableness of doing so to meet such requests as is contained in this resolution." It was decided to suggest to the Minister that action should be taken to have the Act enforced.

Horehound as a Noxious Weed.—In reporting on the resolution carried at Congress—"That the plant known as horehound should be proclaimed a noxious weed," the Professor of Botany (Professor T. G. B. Osborn D.Sc.,) says:—"Horehound (*Marrubium vulgare* L., a native of Europe, was included by F. von Mueller in his list 'Select Extratropical Plants' as desirable to cultivate in Australia. Its value lies in its medicinal property (the principle Marrubium) used in the treatment of coughs. It is a perennial and a free seeding plant. In fruit, the calyx teeth become hardened and form a small burr that clings to wool. The plant prefers dry upland pastures. Horehound is a proclaimed weed for certain shires in Victoria. Pastures on the Pacific Coast of United States of America are said to be so overrun by the weed that all other growth is crowded out. It can be controlled by (a) frequent cutting to prevent seeding, (b) bringing the land under cultivation, when tillage promptly destroys the weed. I consider that it is a decidedly objectionable weed in that stock will not eat the plant because of its bitter taste, and that its luxuriant growth crowds out other vegetation on some soils. Whether its proclamation as a noxious weed will have any effect in checking its spread is a matter involving a question of policy upon which I cannot express an opinion". It was decided that a copy of the report should be forwarded to the Georgetown Branch, pointing out that there was no evidence from other districts to show that the plant was spreading rapidly, and asking for information regarding the reasons which had led them to urge the inclusion of the plant on the list of noxious weeds.

Fertilisers Act.—The following resolution was carried at the 1923 Congress:—"That in the opinion of Congress the Fertilisers Act should be amended in such a manner as to require guarantees to indicate the phosphoric acid content instead of the tricalcic phosphate". The following report on the matter was supplied by the Horticultural Instructor (Mr. Geo. Quinn):—"I have read the resolution, and regret not having been able to be present at the Congress when the discussion

WHEN POULTRY KEEPING IS MOST PROFITABLE.



Taking it by and large, poultry keeping is a game of many ups and downs for the poultry keeper who takes no precaution to keep his hens laying consistently the whole year round. The profits made when eggs are plentiful very quickly diminish when "Winter comes" and eggs are scarce. And yet, making sure of a good Winter egg supply involves only the expenditure of a ha'penny a day for every 12 fowls and the very little effort involved in mixing

'KARSWOOD'
POULTRY SPICE
with the wet or dry mash. This is a fact well known to prominent breeders and to over half a million small poultry keepers throughout the World. **'KARSWOOD'** supplies tonic ingredients and food properties which promote health and vigor in the birds, thus enabling

them to produce more eggs by natural means, and to effect a quick and thorough moult, and get down to the business of earning profits again without delay.

By starting **'KARSWOOD'** feeding now, you are insuring your Winter profits, you are increasing the value of your birds, and you are making certain of fertile, hatchable eggs and healthy chicks when next the breeding season comes around.

Start this insurance today. Go to your local grocer, storekeeper, or produce dealer, get a 1s. packet and commence feeding to-morrow. If your local dealer cannot supply you, he can get supplies from the Agents named below.

NOTE THE ECONOMY.

One tablespoonful ($\frac{1}{2}$ oz.) of **'KARSWOOD'** Poultry Spice (containing ground insects) is sufficient for 20 hens for one day. So that it costs you less than a $\frac{1}{2}$ d. a day for 12 birds.

1s. packet (1lb.) supplies 20 hens 12 days.
2s. packet (2lb.) supplies 20 hens 32 days.
13s. tin (7lbs.) supplies 140 hens 32 days.
14lbs. tins, 25s. 28lbs. tins 48s.

Makes 12 Hens Lay for $\frac{1}{2}$ d. a Day.

AGENTS FOR SOUTH AUSTRALIA—

S. C. EYLES & Co.,
CURRIE ST., ADELAIDE.

upon it took place. The matter was not lost sight of when the present Fertilisers Act was being drafted in 1918. It was ascertained at that time that the expression of the phosphatic contents in terms of phosphoric acid had been adopted into the laws of the other States of the Commonwealth dealing with Fertilisers, but the feeling which Dr. Hargreaves shared with me at that time was that usage had made the terminology of our law reasonably understandable to our farmers and gardeners. I presume the object of the mover of this resolution was to secure uniformity, more particularly if his supplies of fertilisers are likely to be brought over the border from Victoria or New South Wales. In-so-far as the relative accuracy of the terms is concerned, guarantees given to indicate the phosphoric acid content are no more correct and probably less informative to the average user than are the terms 'Water Soluble' and 'Acid Soluble' phosphates. Dr. Hargreaves informs me that at the Conference of Agricultural Analysts, held in Melbourne during May of this year, it was resolved that it was desirable that the Fertilisers Act of the various States should be amended and brought into line in-so-far as uniformity was concerned. The New South Wales Department of Chemistry undertook to draft a uniform Bill to submit to the other States, and although not hostile to the request of the Bureau Congress, I do not recommend any amendments to our Fertilisers Act until the draft is forthcoming."

Michaelmas Holidays.—The resolution, "That the Education Department be asked to alter the date of the Michaelmas holidays to synchronise with Show Week so that country children might have an opportunity of attending the show," which was carried at the 1922 Congress, was again brought before the Board, when it was decided that the resolution should be transmitted to the Royal Agricultural and Horticultural Society, asking their support of the resolution.

Rail Fares to Winter School at Roseworthy Agricultural College.—Information was received from the Chief Railways Commissioner, that arrangements would be made with the Roseworthy Agricultural College to grant the request of the 1923 Congress that Branch members, irrespective of age travelling to the Winter School at Roseworthy Agricultural College should be granted railway tickets at excursion rates.

Allotment of Dry Blocks on Irrigated Areas.—The Irrigation Commission, in reply to a resolution carried at Congress, "That the Government be asked to expedite the allotment of dry blocks in the irrigation areas to overcome the shortage of wood supplies for settlers' use," stated that every endeavour was being made to expedite the allotment of all unallotted blocks in the irrigation areas, and it was anticipated that a number of dry blocks in the Berri and Cobdogla areas would be offered at an early date.

Compulsory Registration of Stallions.—The Secretary reported that the resolution passed at Congress "That it is desirable to provide for the compulsory registration of stallions," had been noted by the Minister.

Size of Cornsacks.—The Marama Branch, which was responsible for the resolution carried at Congress, "That all bags in a bale be made the same size," submitted two cornsacks, showing a considerable variation in size, for the examination of the Board. After a full discussion, it was decided, on the motion of Mr. A. M. Dawkins, seconded by Mr. F. Coleman, "That the bags be forwarded to the Controller of Customs with the request that the necessary action be taken to avoid a repetition of the trouble." On the motion of Mr. C. J. Tuckwell, seconded by Capt. White, it was also resolved, "That the Secretary of the Board should ask the Marama Branch to keep a record of the numbers of the bales that contained sacks of an irregular size, and also the name of the firm from whom the bags were obtained, in order that the name of the manufacturer might be traced.

Veterinary Surgeon for Eyre Peninsula.—At the recent Conference of Eyre Peninsula Branches it was resolved,—"That the Government be asked to station a Veterinary Surgeon on Eyre Peninsula, and that it be assured that the Conference, in making this request, agrees to the principle of payment by stockowners for services rendered by such officer." On the motion of Capt. White, seconded by Mr. A. M. Dawkins, it was decided—"That the Government be asked to appoint an officer to the position of Government Veterinary Lecturer." The Board also desired to place on record the valuable services that had been rendered by Mr. F. E. Place during the time that he toured the country in the position of Government Veterinary Lecturer.

Fruit Cases.—The Longwood Branch forwarded the following resolution—"That in the event of an Act coming into force relating to the manufacture of fruit cases, that it be made compulsory that all standard cases be made with soft wood ends as an insurance against excessive shrinking or warping." The Secretary was instructed to ask Mr. H. Wicks, who had been closely connected with the matter, to prepare a report on the subject.

Crop Competitions.—The Naracoorte Branch asked that the minimum area of 50 acres of crop to be entered for competition under the scheme inaugurated by the Advisory Board, be reduced to 25 acres, or that one-fifth of the total area of land sown on a farm be eligible for the competition. It was decided to refer the matter to the Committee appointed by the Government to manage the competitions.

Refrigeration of Fresh Fruit.—The Hills Conference resolved—"That reports of the investigations recently carried out relative to the refrigeration of fresh fruit be forwarded to all Branches of the Agricultural Bureau, interested in the export of apples." It was decided to ask the Minister to secure sufficient copies of the report to enable each Branch interested to have a copy.

Space in the Journal of Agriculture for Fruit Growing and Mixed Farming.—The Conference recently held at Balhannah requested that more space be allotted in the *Journal of Agriculture* to mixed farming and fruit growing. The Secretary reported that arrangements had already been made to accede to the request of the Conference.

Fruit Diseases Act.—It was decided to ask the Horticultural Instructor (Mr. Geo. Quinn) to furnish a report on the following resolution that had been carried at the Hills Conference—"That the Government take more drastic action to prevent the sale of codlin moth infected fruit, other than to a factory."

Rail and Telephone Charges.—The Board received the following resolution from the Conference of Murray Mallee Lands Branches—"That railway and telephone charges be reduced."

Red Wheats.—The following resolution was carried at the 1923 Conference of Murray Mallee Lands Branches of the Agricultural Bureau—"That the Department of Agriculture compile and publish a list of red varieties of wheats and of white varieties of wheat which are likely to prove efficient substitutes." It was decided to ask the Director of Agriculture to agree to the request of the Conference and that the list should be published in the *Journal of Agriculture*.

Mr. J. W. Sandford.—Mr. J. W. Sandford intimated that owing to the expiration of his term of office as President of the Royal Agricultural and Horticultural Society, he was reluctantly compelled to sever his connection with the Board. Capt. White said he felt sure he was voicing the opinion of members when he said how sorry they were that Mr. Sandford was severing his connection with the Board. He wished to place on record the very valuable advice and help that Mr. Sandford had ever been ready to give to the Board. Messrs. W. S. Kelly, F. Coleman, A. M. Dawkins, and C. J. Tuckwell supported.

Visit of Board to Berri Orchard.—It was decided that the Board should visit the Berri Experimental Orchard on January 23rd, 1924.

New Members.—The following names were added to the rolls of existing Branches:—Brentwood—L. Watters; Redhill—J. T. Gros F. Mahone; Blyth—P. Vogt, E. Walsh, L. C. Mugge; Mount Barker—P. Pondt, W. Blades; Balhannah—M. Rose; Light's Pass—A. Chapman, J. Craig, A. Scholz; McLaren Flat—J. McMurtie, W. R. Dupor C. Burgan, G. Elliott, W. G. Oakeley, A. W. Cross; Aldinga—J. Harvey; Tweedvale—H. G. Schubert, Hugo Berth, F. F. Schape J. C. W. Seidel, R. F. Seidel, H. A. Schapel, W. T. Stone, J. C. R. F. Paelchen, W. H. A. Seidel; Balaklava—A. J. Marrion, F. W. Webb A. Anderson, A. McDonald; Rendelsham—W. Bignell; Arthonlon—J. Frances, E. G. Noall; Allandale East—E. Jennings; New Residence—J. A. Voigt, C. Wedding; Tarcowie—J. Harvie; Gladstone—J. Elmer H. J. P. Kunnick, S. McLeod; Penola—W. Balneaves; Farrell's Flat—P. Maheniphy; Meadows—W. R. Patrick; Shoal Bay—F. J. Kaeshagen, T. Beare; Kybybolite—H. Pettit, J. Kealy; Berri—J. Smith; Kilkerran—T. G. Sutter, A. E. Lehman; Bethel—E. N. Seigat E. R. Weichert, W. C. W. B., and H. M. Peltz.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR JANUARY, 1924.

[By C. H. BEAUMONT, Orchard Instructor.]

Fruit harvesting will be in full swing this month. Very often this operation is the most carelessly performed of all the orchard practices. A grower will take every care in tilling, pruning, and spraying, and then lose the benefit of his work by careless picking and packing. A good pack makes a good name and the consumer soon knows where he can place orders with confidence. So pick carefully and pack thoroughly. Badly graded, and badly packed fruit lessens the demand and lowers the price. Do not waste any fruit. Have your trays ready, and dry all not wanted fresh. To get good dried fruit you must have good fresh fruit. Small and damaged fruit makes a poor product and spoils prices.

Continue with budding operations, taking care to use only plump, healthy buds, from known trees. Protect apples and pears by keeping the spraying outfit busy; codlin moth will do very little damage if a coat of arsenate of lead be kept on the fruit. Moth infested windfalls spread the insect more than any other means, so keep the land clear. Pigs enjoy windfalls.

Lime sulphur solution will keep fungus pests in check during summer. Spray vines with Bordeaux mixture as a protection against downy mildew. Currant and raisin growers should have their evaporators ready for use. They may not need them, but it is well to be ready and save delay if the weather is cloudy and damp at drying time. Watch hawthorn hedges, &c., for pear slug and give them a good dusting with earth, slack lime or ashes. This will help to keep the fruit trees free. Any pear slug affecting apple, pear or cherry trees will be controlled by the arsenate of lead spray.

THE MCGILLIVRAY **Patent Rotary Grain Pickler**

Unequalled for speed and efficiency.

ENSURES that EVERY GRAIN is WELL RUBBED in the PICKLE

Oblviates any possibility of over or under pickling your grain.

YOU CANNOT HAVE SMUT IF YOU USE THIS MACHINE.

A BOY CAN EASILY OPERATE IT, AND PICKLE 100 BAGS A DAY.

See it in operation and judge its merits for yourself.

ALL INQUIRIES TO—

J. L. CAMPBELL & Co., Currie Street, Adelaide

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., NOVEMBER, 1923.

IMPORTS.

Interstate.

Apples (bushels)	15,001
Bananas (bushels)	10,358
Gooseberries (bushels)	4
Loquats (bushels)	1
Passion Fruit (bushels)	131
Pineapples (bushels)	124
Cucumbers (bushels)	366
Onions (bags)	491
Potatoes (bags)	10,077
Bulbs (packages)	32
Plants (packages)	77
Seeds (packages)	42
Wine casks, empty (number)	3,202
Rejected—1bush. of apples and 18bush. bananas.	
Fumigated—16 wine casks.	

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	10,425
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EXPORTS.

Federal Commerce Act.

Three thousand two hundred and sixty-one packages of dried fruit, 580 packages of citrus fruit, 80 packages of preserved fruit, and 1 package of honey were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit	2,364
Honey	1
Oranges	3

New Zealand.

Dried fruit	225
Citrus fruit	577
Preserved fruit	80

India and East.

Dried fruit	232
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Vancouver.

Dried fruit	120
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South Africa.

Dried fruit	320
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RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of December, 1923, also the average precipitation to the end of December, and the average annual rainfall.

station.	For Dec., 1923.	To end Dec., 1923.	A'ge. Annual Rainfall	Station.	For Dec., 1923.	To end Dec., 1923.	A'ge. Annual Rainfall.
Far North and Upper North.				Lower North—continued.			
Oodnadatta	3.25	5.49	4.94	Spalding	1.48	19.57	20.27
Marree	1.06	4.76	6.07	Gulnare	3.74	21.87	10.36
Farina	1.47	6.82	6.66	Yaaka	3.82	18.56	15.48
Copley	1.16	6.73	8.39	Koolunga	3.57	18.24	15.89
Beltana	1.64	7.70	8.97	Snowtown	1.48	17.02	16.07
Blinman	2.64	11.22	12.53	Brinkworth	2.78	18.54	16.30
Terooia	2.55	5.52	7.74	Blyth	2.00	18.93	17.03
Hookina	3.16	10.60	13.46	Clare	3.64	32.25	24.68
Hawker	3.03	13.61	12.92	Mintaro	2.92	33.35	23.57
Wilson	4.08	14.29	12.58	Watervale	2.30	31.77	27.54
Gordon	4.26	10.96	11.55	Auburn	2.23	27.87	24.35
Quorn	3.90	16.07	14.21	Hoyleton	1.76	18.05	17.91
Port Augusta	2.71	10.09	9.67	Balaklava	2.41	17.51	15.95
Port Augusta West	2.38	9.10	9.71	Port Wakefield	1.09	13.33	13.28
Bruce	5.13	12.45	10.77	Terowie	2.82	13.99	13.82
Hammond	4.93	16.04	11.91	Yarcowie	2.03	12.98	14.22
Wilmington	2.59	19.25	18.39	Hallett	1.79	18.70	16.49
Willowie	4.61	18.12	12.57	Mount Bryan	3.72	22.99	16.81
Melrose	3.97	31.09	23.40	Kooronga	3.03	21.29	18.69
Booleroo Centre	5.03	22.78	15.65	Farrell's Flat	3.00	23.21	19.00
Port Germein	1.48	13.07	12.89	West of Murray Range.			
Wirrabara	2.74	23.06	19.78	Manoora	2.27	25.52	18.92
Appila	2.36	17.59	15.00	Saddleworth	2.46	25.38	19.78
Cradoek	3.51	11.89	11.52	Marrabel	2.83	29.34	19.78
Carrieton	3.06	14.87	12.90	Riverton	2.74	29.72	20.79
Johnburg	5.50	14.05	10.91	Tarlee	2.71	28.60	17.93
Eurelia	5.05	16.05	13.64	Stockport	2.55	26.72	16.63
Orroroo	1.74	13.68	13.73	Hamley Bridge	2.43	25.63	16.59
Nackara	2.85	9.08	11.99	Kapunda	3.97	29.42	19.89
Black Rock	2.70	16.68	12.75	Freeling	2.04	26.22	17.99
Ucoita	1.68	9.81	12.04	Greenock	2.33	32.13	21.68
Peterborough	3.11	16.24	13.53	Turo	2.63	30.24	20.20
Yongala	4.07	20.75	14.58	Stockwell	2.60	29.94	20.32
Lower North-East.				Nuriootpa	2.91	28.16	21.00
Yunta	2.23	5.77	8.88	Angaston	2.28	30.16	22.53
Waukaringa	1.15	5.95	8.54	Tanunda	2.15	31.70	22.24
Mannahili	2.66	6.94	8.67	Lyndoch	2.84	40.64	22.93
Cockburn	2.41	7.31	8.31	Williamstown	3.29	39.30	27.48
Broken Hill, N.S.W.	3.26	10.22	9.98	ADELAIDE PLAINS.			
Lower North.				Mallala	1.72	24.42	16.72
Port Pirie	2.70	15.53	13.55	Roseworthy	1.93	25.90	17.35
Port Broughton	1.16	15.88	14.29	Gawler	2.90	27.37	19.11
Bute	2.30	20.13	15.78	Two Wells	2.31	22.63	15.88
Laura	1.65	22.09	18.26	Virginia	2.42	25.71	17.32
Caltonie	2.47	20.59	17.20	Smithfield	2.38	26.65	17.24
Jamestown	3.82	24.53	17.89	Salisbury	2.63	31.09	18.51
Bundaleer W. Wks.	4.74	22.28	18.09	North Adelaide	2.89	33.65	22.37
Gladstone	1.97	22.57	16.29	Adelaide	2.73	29.79	21.08
Crystal Brook	1.80	18.20	15.95	Glenelg	2.20	24.30	18.45
Georgetown	2.28	23.02	18.55	Brighton	2.17	27.21	21.37
Narriady	1.63	15.28	16.37	Mitcham	3.45	35.34	24.26
Redhill	3.98	19.64	16.94	Glen Osmond	2.78	39.17	25.94
				Magill	2.56	40.09	25.35

RAINFALL—continued.

Station.	For Dec., 1923.	To end Dec., 1923.	Av'ge. Annual rainfall	Station.	For Dec., 1923.	To end Dec., 1924.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES.				WEST OF SPENCER'S GULF—continued.			
Teatree Gully.....	1.74	42.02	27.77	Talia.....	1.14	16.26	15.32
Stirling West.....	4.06	66.18	46.82	Port Elliston.....	2.03	20.65	16.56
Uraidla.....	3.60	63.32	44.23	Cummins.....	1.50	21.10	18.58
Clarendon.....	2.40	43.62	33.09	Port Lincoln.....	3.00	22.79	19.66
Morphett Vale.....	1.87	29.00	22.90	Turnby.....	2.19	15.58	14.56
Noarlunga.....	1.54	27.66	20.41	Carrow.....	1.49	13.08	14.42
Willunga.....	1.28	32.29	25.99	Arno Bay.....	0.98	12.16	13.96
Aldinga.....	1.85	24.98	20.44	Cowell.....	1.61	9.43	11.63
Myponga.....	2.55	35.25	29.80	Minnipa.....	2.01	13.89	15.51
Normanville.....	3.56	30.89	30.70				
Yankalilla.....	3.26	31.96	23.31	YORKE PENINSULA.			
Mount Pleasant.....	2.84	43.48	27.28	Walleroo.....	1.29	16.20	14.13
Birdwood.....	2.06	43.51	29.39	Kadina.....	1.74	19.30	16.02
Gumeracha.....	2.34	51.71	33.36	Moonta.....	0.87	17.48	15.35
Millbrook Reservoir.....	2.52	55.56	36.21	Green's Plains.....	1.54	19.97	15.86
Tweedvale.....	3.12	54.72	35.65	Maitland.....	0.54	26.50	20.17
Woodside.....	2.79	43.53	32.20	Ardrossan.....	0.62	17.24	14.18
Ambleside.....	2.96	51.22	34.82	Port Victoria.....	1.06	20.95	15.50
Nairne.....	3.24	36.24	28.44	Curramulka.....	1.31	22.18	18.26
Mount Barker.....	3.04	46.43	31.30	Minlaton.....	1.86	24.75	17.90
Echunga.....	3.41	48.34	33.06	Brentwood.....	1.31	20.03	15.83
Macclesfield.....	3.05	40.08	30.65	Stansbury.....	1.21	23.94	17.01
Meadows.....	4.30	51.29	36.19	Warooka.....	1.60	26.62	17.80
Strathalbyn.....	2.17	24.70	19.36	Yorkstown.....	1.66	22.08	17.24
				Edithburgh.....	1.63	22.74	16.58
MURRAY FLATS AND VALLEY.				SOUTH AND SOUTH-EAST.			
Meningie.....	1.81	23.91	18.74	Cape Borda.....	2.72	27.81	25.08
Milang.....	2.12	16.19	15.45	Kingscote.....	3.47	24.16	19.04
Langhorne's Creek.....	2.08	18.61	14.77	Penneshaw.....	3.04	20.10	19.47
Wellington.....	1.96	17.18	14.80	Victor Harbor.....	1.98	22.43	21.49
Tailem Bend.....	1.88	18.42	14.68	Port Elliot.....	2.23	22.40	20.42
Murray Bridge.....	1.82	15.31	13.94	Goolwa.....	2.41	17.16	17.89
Callington.....	2.19	18.48	15.49	Pinnaroo.....	1.07	17.31	15.50
Mannum.....	1.41	11.43	11.66	Parilla.....	1.91	18.22	14.51
Palmer.....	1.78	18.01	15.46	Lameroo.....	1.93	20.98	16.32
Sedan.....	2.29	16.23	12.27	Parrakie.....	2.01	18.58	14.58
Swan Reach.....	1.03	10.48	11.06	Ceranium.....	1.61	19.85	16.62
Blanchetown.....	0.99	5.70	10.09	Peake.....	1.44	18.67	16.73
Eudunda.....	1.46	18.58	17.51	Cooke's Plains.....	1.63	20.76	15.14
Sutherlands.....	1.47	13.02	11.20	Coomandook.....	1.39	17.94	17.49
Morgan.....	0.76	7.74	9.30	Coonalpyn.....	1.99	21.39	17.49
Waikerie.....	0.48	7.95	9.87	Tintinara.....	1.46	23.21	18.79
Overland Corner.....	1.66	7.59	11.03	Keith.....	1.45	20.94	18.22
Loxton.....	0.55	10.26	12.51	Borderstown.....	1.60	22.61	19.39
Renmark.....	0.88	8.60	11.06	Wolseley.....	2.13	24.80	18.12
Monash.....	3.04	11.33	—	Frances.....	2.84	26.71	19.73
				Naracoorte.....	2.04	26.33	22.57
WEST OF SPENCER'S GULF.				Penola.....	1.97	31.01	26.26
Eucala.....	3.15	8.20	10.01	Lucindale.....	1.64	27.15	23.00
White Well.....	0.33	4.71	9.20	Kingston.....	1.90	25.57	24.51
Fowler's Bay.....	0.58	12.42	12.14	Robe.....	2.16	25.93	24.69
Penong.....	2.41	14.72	12.53	Beachport.....	1.98	24.50	22.20
Ceduna.....	0.95	10.31	10.25	Millicent.....	2.40	35.22	29.39
Smoky Bay.....	1.43	13.30	10.98	Kalangadoo.....	1.91	38.71	32.47
Petina.....	1.81	15.72	12.95	Mount Gambier.....	2.52	33.88	31.28
Streaky Bay.....	1.49	16.59	18.07				

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings		Branch.	Report on Page	Dates of Meetings	
		Jan.	Feb.			Jan.	Feb.
Abbotsford	621	—	—	Gladstone	586	18	15
Alinga	—	—	—	Glencoe West	—	—	—
Alundale East	622	—	—	Glossop	609	23	27
Ampton	—	21	18	Goode	—	23	20
Angaston	—	—	—	Green Patch	600, 603	21	18
Apple Yarrowie	—	—	—	Gumeracha	—	21	18
Arbuthnot	—	—	—	Halidon	—	—	—
Arbuthnot	—	—	—	Hartley	—	—	—
Arbuthnot	—	—	—	Hawker	—	22	19
Arbuthnot	—	—	—	Hilltown	—	—	—
Arbuthnot	—	—	—	Hookina	—	17	21
Arbuthnot	—	—	—	Inman Valley	—	—	—
Arbuthnot	—	—	—	Ironbank	—	19	16
Arbuthnot	—	—	—	Kadina	—	—	—
Arbuthnot	—	—	—	Kalangadoo (Women's)	—	12	9
Arbuthnot	—	—	—	Kalangadoo	624	12	9
Arbuthnot	—	—	—	Kangarilla	—	18	22
Arbuthnot	—	—	—	Kanmantoo	—	19	16
Arbuthnot	—	—	—	Keith	—	—	—
Arbuthnot	—	—	—	Ki Ki	—	—	—
Arbuthnot	—	—	—	Kilkerran	586	17	21
Arbuthnot	—	—	—	Kimba	—	—	—
Arbuthnot	—	—	—	Kingston-on-Murray	—	—	—
Arbuthnot	—	—	—	Kongorong	624	17	21
Arbuthnot	—	—	—	Koonibba	—	18	15
Arbuthnot	—	—	—	Koppio	—	21	18
Arbuthnot	—	—	—	Kybybolite	—	R	21
Arbuthnot	—	—	—	Lake Wangary	603	19	16
Arbuthnot	—	—	—	Lameroo	—	25	22
Arbuthnot	—	—	—	Laura	590	19	23
Arbuthnot	—	—	—	Lenswood and Forest	612, 621	—	—
Arbuthnot	—	—	—	Range	—	—	—
Arbuthnot	—	—	—	Light's Pass	592, 596	—	—
Arbuthnot	—	—	—	Lipson	—	—	—
Arbuthnot	—	—	—	Lone Gum and Monash	—	16	20
Arbuthnot	—	—	—	Lone Pine	593	—	—
Arbuthnot	—	—	—	Longwood	—	—	—
Arbuthnot	—	—	—	Lorton	—	—	—
Arbuthnot	—	—	—	Lucindale	—	—	—
Arbuthnot	—	—	—	Lyndoch	—	17	21
Arbuthnot	—	—	—	McLachlan	603	—	—
Arbuthnot	—	—	—	McLaren Flat	614, 616	—	—
Arbuthnot	—	—	—	MacGillivray	613, 621	R	19
Arbuthnot	—	—	—	Maitland	—	17	21
Arbuthnot	—	—	—	Mallala	—	21	18
Arbuthnot	—	—	—	Maltee	—	18	15
Arbuthnot	—	—	—	Mangalo	—	—	—
Arbuthnot	—	—	—	Mannanarie	588	—	—
Arbuthnot	—	—	—	Marama	609	R	R
Arbuthnot	—	—	—	Meadows	621	16	20
Arbuthnot	—	—	—	Meningie	—	—	—
Arbuthnot	—	—	—	Milang	—	12	9
Arbuthnot	—	—	—	Millicent	623	5	2
Arbuthnot	—	—	—	Miltalie	600, 603	R	16
Arbuthnot	—	—	—	Mindarie	—	7	4
Arbuthnot	—	—	—	Minlaton	—	18	16

INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings	
		Jan.	Feb.			Jan.	Feb.
Minnipa	604, 610	16	20	Rockwood	*	21	18
Monarto South	596	—	—	Rosedale	*	—	—
Moonta	*	R	15	Rosy Pine	*	—	—
Moorak	*	17	21	Saddleworth	*	—	—
Moorlands	604	—	—	Saddleworth (Women's)	*	8	12
Moorook	†	21	18	Salisbury	*	1	5
Morchard	621	R	16	Salt Creek	*	—	—
Morphett Vale	621	R	21	Sandalwood	*	—	—
Mount Barker	*	16	20	Shoal Bay	621	—	—
Mount Bryan	*	—	—	Smoky Bay	*	—	—
Mount Byron East ..	*	—	—	Spalding	*	—	—
Mount Compass	†	—	—	Stockport	*	—	—
Mount Gambier	†	12	9	Streaky Bay	603	—	—
Mount Hope	600	R	16	Strathalbyn	620	22	19
Mount Pleasant	621	—	—	Talia	*	14	11
Mount Remarkable ..	*	—	—	Tantanoola	*	19	16
Mount Schank	*	22	19	Taplan	*	22	19
Mundalla	*	16	20	Tarcowie	589	22	19
Murray Bridge	*	—	—	Tarlee	596	R	R
Mypolonga	610	16	20	Tatiara	624	19	16
Myponga	*	—	—	Tweedvale	521	24	21
Myrka	*	19	16	Two Wells	*	—	—
Nantawarra	596	17	21	Uraidla & Summertown ..	*	7	4
Naracoorte	624	12	9	Veitch	*	—	—
Narridy	*	19	23	Virginia	*	—	—
Narrung	*	19	23	Waikerie	*	—	—
Neeta	*	—	—	Wall	*	—	—
Nelshaby	*	19	16	Wanbi	*	—	—
Netherton	610	R	14	Warcovie	585	—	—
North Booborowie ..	588	R	R	Watervale	*	—	—
North Bundaleer	*	—	—	Weavers	*	21	18
Northfield	*	—	—	Wepowie	585-6	R	19
Nunkeri and Yurgo ..	*	6	3	Whyte-Yarcowie	*	—	—
O'Loughlin	*	16	20	Wilkawatt	608	19	16
Orroroo	†	—	—	Williamstown	*	2	16
Owen	593	18	15	(Women's)	*	—	—
Parilla	605, 610	R	15	Williamstown	596	18	15
Parilla Well	*	21	18	Willowie	*	16	20
Parrakie	*	—	—	Wilmington	*	16	20
Paruna	*	R	—	Windsor	594	—	—
Paskeville	*	18	15	Winkie	*	—	—
Pata	*	—	—	Wirrabara	590	—	—
Penola	624	2	1	Wirrega	*	—	—
Petina	*	26	23	Wirrilla	†	19	16
Pinnaroo	*	R	R	Wirrulla	601	—	—
Pompoota	*	9	13	Wolowa	*	—	—
Poochera	603	—	2	Wookata	602	—	—
Port Broughton	*	18	15	Wudinna	*	—	—
Port Elliot	*	16	20	Wynarka	*	—	—
Port Germein	*	26	23	Yacka	*	22	19
Pygery	*	19	16	Yadnarie	†	R	19
Ramco	†	21	18	Yallunda Flat	*	—	—
Rapid Bay	619	5	2	Yaninee	*	—	—
Redhill	*	—	—	Yeelanna	*	19	16
Rendelsham	524	16	20	Yongala Vale	*	—	—
Renmark	606	17	21	Yorketown	*	—	—
Riverton	*	—	—	Younghusband	*	24	21
Riverton (Women's) ..	*	—	—				
Roberts and Verran ..	†	R	21				

* No report received during the month of December. † Held over until next month. R. Received.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS. UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WARCOWIE (Average annual rainfall, 12.16in.).

November 21st.—Present: seven members.

MIXED FARMING.—The following paper was read by Mr. E. Jarvis:—"For mixed farming in this district I favor wheat and sheep. I consider that half of the crop should consist of Federation, because it is able to withstand the dry spells better than most varieties, but it is advisable to sow three or four different sorts of wheat. The same land should not be sown more than twice in succession. Fallowing should be commenced as early as possible, because the land usually sets very hard if left late in the season. Enough sheep should be kept on the fallow to keep the weeds from going to seed. Farming is not a very payable proposition without sheep. Farmers should rear the lambs and dispose of the surplus sheep, because in dealing there is a grave danger of introducing noxious weeds on to the farm. Cows pay very well during a few months of the year, but my opinion is that one could keep enough extra sheep to pay equally as well if a paddock were not reserved for cows. We should also be careful not to keep any more horses than are required." A good discussion followed.

WEPOWIE (Average annual rainfall, 13in. to 14 in.).

October 23rd.—Present: nine members and three visitors.

HAY AND HAY MAKING.—In the course of a paper dealing with this subject, Mr. T. F. Orrock said he had had considerable experience in growing varieties of wheat for hay, but he was of the opinion that the King's Early varieties were the best, preferably King's Red. It was a good plan to sow the hay wheat first, which would enable that portion of the crop to be cut early, and the hay would be ready to cut before any oats that might be present had shaken out. Hay of a splendid quality could be obtained by sowing a few acres of oats and then mixing the oat sheaves in the stack with the wheaten hay. Hay should never be carted until it had been cut at least 14 days. With the exercise of a little care in the handling of the binder, sheaves of an even and fair size could be made. When the binder was being worked the platform should be about 6in. lower in front than at the back, in order to give the driver more clearance over stones. It also had the effect of making all the butts of the stalks keep tightly against the front of the binder whilst they were passing through the elevators. The butter should be set back towards the knottor at a fair angle, thus tightening the butt and making an almost square and firm sheaf, with one side a little longer than the other. The tail board should be kept firmly against the heads of the hay to prevent the machine making uneven sheaves. The sheaf carrier should be in good order and carry five sheaves to each row, to place the hay as conveniently as possible for stooking. In cutting a crop that was "down" badly and lying in the same direction that the machine was working, it was advisable to take a full cut and work the reel as far forward and as low as possible. In cutting an ordinary crop, the lower the cutting was done the better would be the butt of each sheaf. The stack should not be less than 6yds. wide, and the sheaves should

be placed with butts out through the stack. The outside row of sheaves should be placed tightly on edge, and each succeeding row of sheaves just touching the row which preceded it. If the outside row were placed with the longest side of the butt of the sheaf upwards, the wall of the stack would be given a gradual outwards slope. The middle of the stack should always be 2ft. or 3ft. higher than the sides. Before a start was made to form the roof, the centre of the stack should be raised 5ft. or 6ft. higher than the walls, and then the roof could be finished off quickly without going to any unnecessary height. A keen discussion followed.

WEPOWIE (Average annual rainfall, 13in. to 14in.).

November 20th.—Present: 11 members and three visitors.

THE FARM VEGETABLE GARDEN.—The Hon. Secretary (Mr. W. J. F. Smith), in the course of a paper dealing with this subject, said the plot selected for the farm garden should contain about half an acre of good land, and be securely enclosed with a netting fence. It should be sheltered from the wind, and ploughed to a depth of about 10in. if the soil was not "clayey," but if there was a clay subsoil it was a good plan to cart loamy soil and old stable manure on to the plot and dig it into the soil. The land could then be cultivated again after the first rain, and worked down to a fine tilth. Before planting, another good dressing of stable manure should be applied, and dug into the soil. Almost all varieties of vegetables would grow in that district if given a little attention and plenty of water. Turnips, carrots, parsnips, and beetroot should be planted in May, in rows about 1ft. apart, so that they could easily be thinned out. Lettuce, cabbage, and cauliflower seed should be sown in a well-manured bed or box. Potatoes should be planted about June, in rows 2ft. apart, with 8in. or 9in. between each set. After the plants had been up about two or three weeks they should be well "earthed up." Onions should be planted about June in rows 2ft. apart, with 4in. or 5in. between each plant. He recommended Silver Skin and Brown Spanish as suitable varieties for that district. Peas should be planted in rows about 18in. apart, William Hurst being an excellent variety. Tomatoes required a fine and well-manured seed bed. They should be sown in July or August. Once the plants came through the soil they should be left uncovered, in order to make hardy growth. When the plants were ready for transplanting they should be placed in rows about 2ft. apart, with 2ft. between the plants. For melons, courgettes, cucumbers, &c., a hole about 2ft. deep and 3ft. in diameter should be made, and then filled with a mixture of stable manure and good soil. A bed of that size would hold about 12 seeds, and when they were ready to transplant, all the plants with the exception of three or four should be removed. These plants, especially cucumbers, required heavy waterings.

EURELIA, October 29th.—Messrs. Butterfield and Harvey (members of Parliament for the district) attended the meeting and delivered addresses.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

GLADSTONE (Average annual rainfall, 16in.).

November 23rd.—Present: 17 members.

HORSE POWER ON THE FARM.—In the course of a paper dealing with this subject, Mr. C. H. Lines first referred to the claims made in favor of the tractor by some farmers. He considered the estimated cost of purchase and upkeep of an eight-horse team to be exaggerated. A good eight-horse team of three-year-olds could be purchased at an average price of £25 per head. It could safely be reckoned that the horses would have a working life of 12 years. The cost of harness would be about £5 per head and each set of chains 8s. A chaff cutting plant, costing £100, would last the life of two horses; repairs to harness, 7s. per head; and the price of 40 tons of hay in the stack and a few

An illustration of a rural farm scene. In the foreground, there are two large, dark, leafy trees. In the background, a tractor is pulling a plow across a field. To the right, there is a small farm building and a windmill. The sky is filled with stylized, radiating lines, suggesting a bright sun or moon. The entire scene is framed by a decorative border.

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bags of barley should cover the expense of the horse team. Labor he had not considered, because that applied in the case of the tractor as well as the horse. On the above figures he thought that 200 acres of land could be worked for about 12s. per acre. If the horses were sold when 12 years old, they would bring in a few pounds, but after 12 years' work the tractor would be of very little value. Again, most farm laborers could manage a team of horses, but to drive and manage a tractor it would be necessary for the laborer to have some mechanical knowledge. In the discussion that followed, Mr. R. E. Lines said there was no doubt that to a certain extent the tractor had come to stay. During his recent trip to England he had found that a tractor which cost £230 in Australia could be purchased in the former country for £130, while a similar machine was to be had in the United States for £70. Mr. E. T. Hollitt was of the opinion that good points could be quoted in favor of the tractor, but he thought that even with the tractor, one would require a team of horses. Mr. Black said the fact that the tractor could be purchased in England for £100 less than in Australia was to a great extent responsible for its popularity in the former country. The Chairman (Mr. L. J. Sargent) then presented Mr. J. H. Sargent with a Life Membership Certificate of the Agricultural Bureau.

MANNANARIE.

October 25th.—Present: 15 members and visitors.

HAY MAKING.—In the course of a paper dealing with this subject, Mr. W. B. Campbell said before a start was made with cutting the hay the binder should be overhauled and placed in good working order. After the first two rounds with the binder the sheaves should be thrown back, and then stooking could be commenced. If wet weather were experienced, the stooks should be made three sheaves wide and not too long, so that air would be able to circulate through the sheaves. Carting should be commenced after the sheaves had been in the stook for eight to 10 days, and the foundation of the haystack should consist of old straw or rubbish to protect the bottom sheaves. There were different methods of building, but the stook with round ends had a very neat appearance when completed. Care should be taken not to allow the ends to become too low. The centre of the stack should not be made too full before the roof was started, and if an extra layer of sheaves were put on it would keep the stack watertight. Sheaves placed butts out made a solid roof, and if the heads were placed outwards, practically all the rain would be kept out of the stack after it had set down. The ends of the stack should face in an easterly and westerly direction, with the opening on the eastern end, because most of the rain came from the west. If oats were cut for hay it was not advisable to cut the crop on the green side.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

October 23rd.—Present: eight members.

THE BLOWFLY PEST.—In the course of a paper dealing with this subject, Mr. B. C. Mannion said the blowfly pest was one of the greatest curses of the Australian sheep industry. The experienced sheepman was able to detect a blown sheep in the flock, because the animal stamped its feet and twitched its tail as it stood in the yard. The flies attacked all classes of sheep, and deposited their eggs on any part of the sheep's body. To keep the flock immune from the pest throughout the year, repeated crutching and the application of approved preventives were necessary. There were many effective solutions on the market, but he expressed preference for bluestone, because it was an inexpensive and a very effective remedy. When the solution was applied to the sheep, it killed the maggots and dried up its wool so that no attraction was left for the fly to blow the sheep again. Bluestone also healed the places where the maggots were embedded in the flesh, and gave immunity for a considerable length of time. The solution was best made with just enough bluestone to color the water. Before any solution was used, the sheep should be crutched and the wool clipped as close to the skin as possible, in order to give the solution a chance to work immediately. If a sheep that had been blown was not attended to, it would soon become low in condition, and in many cases die.

SHEEP FOR THE SMALL LAND HOLDER.—Mr. F. Clark, who read a short paper dealing with this subject, said the time was fast approaching when it would be necessary for the small farmer to devote some of his time to raising other forms of produce than wheat, and he considered sheep to be the most profitable side line. Although their district was recognised as one of the best Merino sheepbreeding districts in the State, he did not think the best returns would be obtained from a flock that was kept with wool production as the main object. For the fat lamb trade he recommended crossbred ewes which carried a strain of Dorset Horn blood. Lambs from such ewes would be ready for market considerably earlier than the Merinos, and they would not be so troublesome, if it became necessary to resort to hand feeding.

TARCOWIE (Average annual rainfall, about 15½in.).

November 20th.—Present: 19 members and nine visitors.

CONVENIENCES FOR THE FARM HOUSEWIFE.—The following paper was read by Mr. G. W. Davidson:—"Every farmer should have the house equipped with as many conveniences as possible to lessen the tiresome duties of the womenfolk. The most convenient and comfortable house would be one under one roof, with large, lofty rooms, and a verandah all around. It would then be much cooler during the summer and warmer in the winter. Wire doors on the outside doors and wire screens on the windows are necessary to keep out flies. The kitchen, being the workshop of the housewife, should be the room with the most conveniences, and made as cool as possible in summer. A fairly large room, with plenty of ventilation, is preferable, and, if possible, one which faces the south or west. If the walls of the kitchen are painted to a height of about 4ft. it would need very little work to keep them clean and neat. In the *Agricultural Journal* one member at Cleve suggested tiling the walls for that height with white tiles. This would be a splendid idea, only that tiles are rather expensive, and the paint could wash almost as easily as the tiles. A 'built-in' stove assists in the cooking, and the stove retains the heat for a long period. A good plan for throwing light on to the top of the stove is to build a window in the outside wall of the chimney, just about a foot or so above the top of the stove. The laying on of water to the kitchen can easily be carried out by having a tank raised on to a stand, and a pipe put through the wall, with a tap inside in the most convenient place. This saves a great deal of time and labor. Other conveniences for the kitchen are cupboards for the saucepans, &c., and shelves with hooks underneath on which to hang the articles used for cooking and washing-up. The bathroom is a necessity, and even when there is only an underground tank it is not impossible for water to be laid on to the bathroom. A small galvanized-iron tank on a high stand connected with the underground tank by a pipe, and water pumped into it by a force pump, will provide water for both shower and bath-tub. Then there are conveniences which can be put into the washhouse. Water can be laid on, and taps put above the washtroughs. A washing machine can be installed, and if there is a sufficient supply and pressure of water available, a water wheel can be used to drive the washing machine. A dairy is also a necessity on a farm, to enable the housewife to keep cream, butter, eggs, meat, &c., cool and fresh with very little trouble. To make a cool dairy it is a good plan to build a concrete roof and then put an iron one about 6in. above it. The iron roof would preserve the dairy by running the water away from the walls during the wet weather and keep the heat out in the summer. The cowshed should be built away from the other buildings, but not too far from the house. I would have it open to the east, and one or two doors in the western side to allow for thorough airing. The time is not very distant when a country home will not be called complete unless it has a power installation for doing the washing, separating, ironing, and lighting appliances, and be connected with the telephone. If the man on the land endeavored to provide such conveniences as those mentioned in the paper, the drudgery of the housewife would be lessened, and a very important point in arresting the drift of the rural population to the city would have been made."

A further meeting was held on November 16th, when Mr. Lines gave an interesting account of a recent trip he had made to England.

WIRABARA (Average annual rainfall, 18.91in.).

November 1st.—Present: 14 members and visitors.

TANNING SMALL SKINS.—The following paper, entitled, "Tanning Small Skins," was contributed by Mr. C. H. Curnow:—"In the first place, the farmer should obtain a small quantity of black wattle bark and chop it into small pieces. All the fat and flesh should be removed from the skins. Next, a barrel or wooden vessel should be secured, and the first pelt placed into the barrel with the fur side downwards. Then a layer of bark should be sprinkled over the flesh side of the skin. Another skin can then be placed in the barrel, special care being taken that the flesh sides of any of the skins do not come into contact with one another. In about three days the skins should be examined and another effort made to remove any flesh or fat that has not been taken off in the first operation. The skins should then be returned to the barrel with a layer of bark between each skin. The skins should be inspected every three or four days for a fortnight, and then once a week until they are tanned, which will take about two or three months, according to the size of the skin. In order to ascertain if the skins are tanned, the edge of the pelt should be cut with a knife, and if a white streak shows on the cut edge, it can be taken as an indication that the tan has not soaked right through the pelt and the skin will have to be returned to the barrel. When thoroughly tanned the skins should be tacked on an old door or some other wide, flat piece of timber, and dressed with as much neatsfoot oil as they will absorb. They can then be placed in a cool place, out of the weather, until they become thoroughly dry. A piece of brick can then be used to smooth off the skin. If the skin that is to be tanned is required for leather, it should first be soaked in a weak solution of slaked lime and water to remove the hair. When the hair has been removed, the skin can then be placed in the tan liquor and treated in the same manner as other skins."

BLAYTH, November 3rd.—The meeting was devoted to a discussion of a scheme proposed by the Branch to inaugurate a seed wheat competition. A committee of management was appointed, and a set of rules governing the competition was compiled. It was also decided to award a trophy, valued at £2 2s. to the best single variety of wheat entered in the competition.

LAURA, November 23rd.—Mr. J. J. Aughey, who read a paper on the subject, "Co-operation," first referred to the advantages of co-operation in the direction of purchase of farm requisites and the disposal of primary produce. He also referred to the difficulties that had been experienced during the present hay harvest in housing the crops, and considered that the inauguration of a co-operative scheme for housing the hay would have been a step in the right direction. He suggested the following plan:—If four farmers, each cutting about 50 tons of hay, were to join forces and place the hay into two stacks, it would be possible, with a little judgment to complete hay earling without getting a stack damaged with rain. He would much rather have the hay out in the paddock when it rained than in a half-built stack, because hay that has been wet in the stack was never so good, no matter how it was dried. In parts of New South Wales stacks which can be completed in one day were built. The above would be co-operation in a practical form, and might lead to something better.

LOWER-NORTH DISTRICT.
(ADELAIDE TO FARRELL'S FLAT.)**BLACK SPRINGS.**

October 2nd.—Present: 17 members.

Mr. K. Dunn read a paper in which he gave an account of the Whyte-Yarwood tractor trial. The report of the delegates to the Annual Congress was also received and discussed.

A further meeting was held on October 22nd, when Mr. J. Howard read a paper, "Topdressing Pastures with Superphosphate."

FARRELL'S FLAT.

November 23rd.—Present: 15 members.

VALUE OF HAY AND CEREALS AS FEED FOR SHEEP.—The following paper was read by Mr. R. Bartholomew:—"Hand feeding of sheep is resorted to in times of drought, or perhaps during the autumn and winter months, to promote a rapid and unrestricted growth of the stock, when the natural feed is backward and early fodder crops are not making headway. In this district hay generally consists of either wheat or oats; barley and rye as a rule only being used in those districts where wheat and oats cannot be depended upon. Rye hay compares very favorably with wheat and oats as a fodder, but the crop must be cut early, which means sacrificing the yield per acre to secure a palatable hay with a high co-efficient of digestibility. Barley hay is also relatively rich in nutrients if cut in the milky stage—in fact, it is almost equal to oat hay; but, unfortunately, it has weak thin-walled straws, which dry out and readily break down to dust when handled. The barley beard is a particularly heavy one, and is regarded as an objection by most people. Wheaten and oat hay form the most suitable fodder of the cereal hays, and are a sufficient ration for the maintenance of sheep during times of drought. From tables dealing with the nutrients contained in both these crops it is found that oat hay is the most valuable as a sheep fodder. Oat hay also encourages milk secretion, and is therefore a good ration for lambing ewes. The method of feeding cereal hay will depend on the conditions in which a farmer is placed. Chaff is the most economical and convenient form, but if a man is so situated that he is not able to cut the hay, there is only one alternative—feed long hay. The objection to this practice is that the sheep will first cut off the heads, and damage the straw, thereby rendering it useless as a fodder.

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As a maintenance ration, wheaten or oatens chaff will doubtless supply the cheapest form of fodder. From feeding trials made in Western Australia it was found that 11b. per day was sufficient to maintain a dry ewe in good health, and that 31b. of oats proved inadequate as a substitute for chaff in the absence of roughage to make up bulk; but on a stubble field this amount sufficed even for ewes heavy in lamb. The obvious deduction is that when dry feed is wanting, chaff must be fed, and that for pregnant ewes, a combination of chaff and grain is required. Cereal grains are the chief source of concentrated foodstuffs used on the farm. They are composed largely of starch and albuminoids, and they present their nutritive components in an easily digested form. They contain from 8 per cent. to 10 per cent. of 'flesh formers' or albuminoids. The percentage of digestible carbohydrate which is largely present in the form of starch ranges from 45 per cent. in oats to over 60 per cent. in wheat and rye. Oats are relatively rich in fats, whilst the others are distinctly poor in this valuable ingredient. It is the presence of so much fat in oats that causes overheating when fed liberally to stock in warm weather. The naked grains have a higher starch value than oats, or barley, and the difference will vary according to the thickness of the covering husks. From observation it has been found that an oatens ration will give rise to larger, healthier, and stronger lambs, and may be fed to lambs at the rate of 41b. per day at four to six weeks old, and then steadily increased till the allowance reaches about 51b. per day. Barley is the next best in value to oats as a lamb food, and wheat is a little inferior to barley. Either of these, however, can be fed advantageously if combined with oats, or with oats and bran, to the extent of half the ration. With lambs, as with most stock, a varied diet is more effective than any single fodder. Where lamb fattening is conducted on a large scale, the general practice is to combine several fodders, such as oats, bran, maize, crushed barley, and oil cake, with a view to tempting the appetite and hastening development. Rye grain is similar in composition to wheat, and it ranks about equal with barley for meat production, but it is not available in any quantity, and the value put upon it as seed for early green feed places it beyond the reach of the stock feeder. Apart from the grains, there are a number of by-products of grains which have a great value as a sheep fodder. Bran and pollard added to chaffed oatens or wheaten straw makes a very satisfactory maintenance ration."

LIGHT'S PASS.

November 22nd.—Present: 19 members.

QUESTION BOX.—The meeting took the form of a Question Box. The first question to be considered was, "Does it pay to summer prune apricots?" The general opinion of the meeting was that summer pruning of apricots was a payable proposition. Mr. B. Boehm quoted instances of the results of summer pruning in his orchard and the increased crop that had been obtained from trees that had been summer pruned. Summer pruning, it was also asserted, assisted in checking black-bud. (2) "Is it advisable to graft apricots on to plum stock?" Mr. Robin cited the case of his own garden, where just as good a crop was obtained from apricots on plum stock as from those on any other stock. He said that the plum stocks produced profitable crops in wet ground. (3) "The use of the tractor for the orchard and vineyard?" Opinions differed on this question, some members speaking in favor of the tractor, whilst others condemned it, but the majority were of the opinion that as yet the tractor was too expensive for a gardener with a small holding, and too unwieldy in the small orchards and vineyards characteristic of the Light's Pass district. (4) "What killed so many apricots this year—moisture in the air or in the ground?" Members were unanimous in the assertion that the excessive flooding of the gardens by continual rain drowned the trees. (5) "Is it advisable to use a spreader with arsenate of lead sprays, and is soap the best agent for the purpose?" The opinion was expressed that it was advisable to use a spreader, but not soap, because it was too expensive. Casein answered the purpose just as well, and could be obtained from firms selling sprays. (6) "Can anything be done to combat the starling pest?" One suggestion was to fix a poll tax on starlings, and ask the district council to give so much a head for each bird. Another suggestion was to catch the birds in their roosting places and destroy them. (7) "What cereal would you recommend sowing as a hay crop in this district?" Mr. F. W. Boehm, supported

by Messrs. E. Polst and S. Ellis, said that a mixture of oats and wheat was the best crop, and advised cutting when the crop showed a greenish yellow color. (S) Which is the better way to cincture four-year-old currant vines strongly grown; should just a ring be cut, or a piece taken right out of the stem? The general opinion was that if the vines were strongly grown it would not hurt them to cut a piece out; but care should be taken not to cut the wood of the vine.

LOVE PINE.

October 22nd.—Present: 18 members two visitors.

GRAZING.—Mr. J. H. Warnest read a paper. He separated grazing into two divisions, viz., general and special. "General grazing is allowing the cattle to run at large on ordinary pasture with no immediate view to fattening for sale, but for keeping them comfortably alive and also for breeding purposes other than stud, and depasturing cattle on special soil, growing grass or herbage of particular value for the purpose of 'topping up' cattle, or for providing an exceptionally robust constitution for young and especially stud stock. Here the selection of country rich in limestone assists in strengthening the bone; and ironstone country gives richness to the blood," the paper read:—"There are two main factors which should always be considered by the man on the land. Horses and cattle in particular need limestone right from infancy, and should be allowed to graze on such country wherever possible until two years old. With horses it is preferable to leave them three years before removing them to soil of a different nature. In reference to sheep, it is desirable to have lambs reared on limestone land until they are 12 months old. If this can be done, the meat becomes much sweeter and a better constitution is built up. When the soil contains a liberal supply of both limestone and ironstone, then it is best adapted for every kind of grazing, especially to the second division. In grazing one has to consider the nature of the country for the different types of cattle. For instance, Hereford cattle are a very hardy type, and therefore would be most suitable to hilly country or country subject to drought. Shorthorn cattle do not grow to maturity so easily as Herefords, but are on the average bigger and more evenly stocked with meat, especially in the hind quarters. Sheep need careful attention, and the country on which they are to remain for some time should not be too sandy, because that seriously affects the wool. In considering land suitable for grazing, it is desirable to secure the best obtainable whenever possible, and with plenty of running water. In conclusion, it is desirable for anyone who goes in for grazing to procure the best kind of stock, and not those of a mongrel breed." An interesting discussion followed.

OWEN.

November 23rd.—Present: eight members.

HAY MAKING.—The first work in the preparation of the hay harvest, said Mr. T. A. Freebairn, in a paper dealing with the subject of "Hay Making," was to overhaul thoroughly the binder, and place it in good working order before it was taken into the field. The stage at which the hay should be cut was a debatable point, but the speaker was of the opinion that best results would be obtained if the crop were cut about two weeks after the flower of the wheat had dropped, and the grain was beginning to set in the head. Oats, however, should not be cut until they were almost ripe. Stooking should be carried out as soon as possible after binding, the sheaves being left in the stook for about 10 or 14 days before being carted into the stack. No time should be lost in completing the stack, because the wheat harvest followed very quickly, and if the stack had to be left uncompleted, there was a great danger of rain damaging the hay. In the discussion that followed, Mr. A. J. Freebairn favored adjusting the machine so that it would make large sheaves to save time and time in handling. He also considered that with large sheaves the hay retained a good color. Mr. W. Marshman recommended the following varieties of wheat for hay:—Late varieties: Zealand and Blue, Leak's Rustproof, and White Tuscan. Early varieties: King's White, Sultan, and Felix. He thought the sheaves should be left in the stook for at least 17 days before being carted into the stack. Mr. H. Bowyer favored Algerian oats for hay. That variety was hardy and disease resistant.

WINDSOR.

September 25.—Present: seven members.

FARM BUILDING.—The following paper was read by Mr. A. Carter:—In writing on this subject I will try to give my idea of what is necessary for the comfortable and efficient handling of a farm in this district. Wheat growing and mixed farming are the lines of agriculture conducted, and the essential buildings are:—Stable, chaff shed, implement shed, barn, cow shed, pig sty, and tool house. The cheapest and best building for the stable is one built of stone with a galvanized iron roof. This building should be about 100 yds. from the dwelling, and should face the east. It should consist of a chaff house and hay shed under a gable roof, with a skillion roof over the stable. This will provide for a greater height for the chaff house and hay shed, but the stable should be at least 6 ft. high on the low side. If this building is 60 ft. long it will accommodate all the horses necessary for the working of a farm say, 500 to 800 acres. The manger should consist of flat galvanized iron built on a wooden frame, and should run the full length of the stable, with an opening in the centre through which a man can pass. A strong loose box should be erected at one end with a gate so hung as to make a crush pen, when opened inwards. A passage at least 4 ft. wide should be left between the back wall of the stable and the manger, and the chaff house should open on to this with a door at least 4 ft. wide. The chaff shed should be large enough to hold 5 tons of chaff, and should have a second door opening on the western side into the hay yard. The remaining space at the rear of the stable can be utilised for the engine house and hay shed. The stack yard at the back of the chaff house should be large enough to permit a trolley and team to drive around, and be able to hold a stack of about 50 tons of hay. It is not advisable to put more hay in this yard than will be required for one year. The yard can be kept cleaner and clearer of mice if the hay is used each year. The implement shed should be built of stone and roofed with iron, and made large enough to hold all the farm implements and machinery, with room for a forge at the southern end. This building should have a gable roof, should face the east, and be built on to the stable, but standing about 40 ft. in front, so that the end wall of the implement shed affords a shelter for the horses in the stable yard. The back wall should be provided with a doorway about 5 ft. from the northern end. This end of the shed can also be used as a shearing shed, and with the aid of hurdles made of stringy bark battens, and two boards about 6 ft. and 8 ft., a fairly convenient shearing shed can be fitted up, and one that can easily be taken down and stacked against the wall of the shed while not in use. The back wall of the implement shed and the end of the stable will form two sides of a convenient sheep yard. The other two sides can be made of cyclone wire with barbed wire on the top, and a gate in the southern end. This yard should be subdivided into three smaller yards with a drafting race and small convenient gates from one yard into another. A mouse-proof barn can be built of galvanized iron, either on piles or dwarf walls. If the barn is built on piles with a piece of flat galvanized iron placed over the top of the piles below the floor joists, the mice can be kept out more effectively. The barn should be at least 15 ft. x 30 ft. in size, and built off the ground to a convenient height for trucking seed or super on or off the wagon or trolley. The cowshed can be built of galvanized iron, and should contain three or four bails with manger for chaff, and a race 3 ft. wide for convenient feeding. This shed should have a concrete floor built up about 2 ins. higher in front than at the back to allow for drainage. The pig sty should be built of stone with an iron roof. This should comprise at least three pens. The back and end walls should be built solidly of stone with a solid post and rail fence in front. The floor should be made of cement concrete, well built up to allow for drainage. The styes can be kept cleaner if an adjoining run of about one-quarter of an acre is provided. Fowl houses can be erected of galvanized iron and facing the north, with portion of the front enclosed for roosting accommodation for the fowls. They should be enclosed with 6 ft. wire netting to keep out foxes. In the discussion that followed, Mr. H. Clark said high land was essential for drainage. Good sheds increased the value of a property, and in the event of a sale the land usually realised the value of the sheds. The stable and implement shed should be some distance apart, owing to the danger of fire. The fowl yard should consist of about one acre of land, and include the haystack if possible, the stable, and a small piece of natural scrub. The birds derived a

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great benefit from the hay and stable yard. Water laid on the the pig sty and fowl yard would be the means of saving a great deal of labor. Mr. H. White agreed that the fowl yards should include the stable and haystack, but steps should be taken to exclude the birds from the implement shed. The floor of the implement shed should be as level as possible, because the machines, if left standing the whole year in an uneven position, were liable to become twisted. Mr. H. Clark considered that iron roofs were too hot for the pigsties unless the houses were roofed with straw as well. Mr. A. Carter said where stone was used for the sties, the pigs could not become a nuisance by rooting, and with an iron roof the sty was kept dry, thus avoiding a disagreeable quagmire. The barn, to be mouse-proof, should be separated from all other buildings. Mr. W. Tonkin advocated a gable roof for the implement shed. Portion of front of the shed should be enclosed. All sheds for stock should face the east.

BALAKLAVA, September 3rd.—The meeting was held in the Halbury Institute. Eight members and 32 visitors were present. The subject for the evening, "Stripper versus Harvester," as introduced by Messrs. Tuck and Rundle. A keen interest was taken in the remarks of the speakers, and a good discussion followed, in which Messrs. F. Webb, A. McDonald, P. Roediger, H. Robertson, A. Anderson, W. Miller, A. Marrior, and D. McArthur took part.

LIGHT'S PASS, December 20th.—Mr. J. G. Stolz delivered an address, in which he recounted some of his experiences during a recent trip through Central Australia.

NANTAWARRA, October 11th.—Mr. A. F. Herbert initiated a discussion on the subject, "Horse Power versus Tractor." The trend of the discussion centred on to the working life of a horse, which was generally agreed to be about six years.

TARLEE, October 15th.—Twenty-two members and five visitors attended the October meeting of the Branch, when the Agricultural Chemist at the Roseworthy Agricultural College (Mr. A. T. Jeffries, B.Sc.) was present, and delivered an address, "The Importance of Chemistry in Agriculture."

TARLEE, November 2nd.—The Superintendent of Experimental Works (Mr. W. J. Spafford) attended the meeting and delivered an address, "Wheat Culture," to an audience of 22 members and two visitors.

WILLIAMSTOWN, November 23rd.—Mr. J. H. Finnis (Secretary of the Advisory Board of Agriculture) attended the meeting and delivered an address, "The Work of the Department of Agriculture." Mr. S. B. Opie (Field Officer of the Department) was also present, and gave a short address, "Tobacco Culture in South Australia."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA.

MOONTA (Average annual rainfall, 15.22in.).

October 26th.—Present: 18 members and one visitor.

Dr. A. K. Clayton attended the meeting and addressed the members on "Mendel's Laws," and illustrated his remarks with blackboard illustrations. Several questions were then asked by the members, and answered satisfactorily by Dr. Clayton.

KILKERRAN.

October 23rd.—Present: nine members and three visitors.

THE FARM GARDEN.—In the course of a short paper dealing with this subject, Mr. B. L. Koch said apart from the fact that the laying out and management of a good farm garden assisted in keeping down the expenses on the holding, a

well kept plot of land devoted to vegetable culture also added to the appearance of the homestead. *He suggested that land of a sandy nature should be selected for the garden, and consideration given to the convenience of the water supply. All rubbish should be removed from the plot, and the soil worked to a depth of at least 4in. Next, the land should be given a thorough watering, and after being left in a rough condition for two or three weeks, it should be worked down to a fine tilth. The plot should be laid out in beds in order to facilitate weeding and watering. In the discussion that followed, Mr. T. Keightly mentioned that superphosphate was not a suitable manure for cabbages and canflowers, but it could be used with excellent results on peas. Mr. Koch preferred superphosphate to stable manure, on account of the large number of weed seeds that were brought to the soil with the latter.

TO FORDSON OWNERS.

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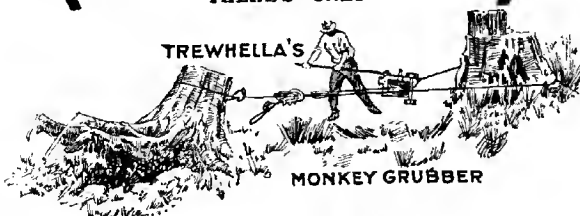
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WESTERN DISTRICT.

BIG SWAMP.

October 25th.—Present: seven members and two visitors.

RABBIT DESTRUCTION.—In the course of a paper dealing with this subject, one of the members said the whole question of rabbit destruction could be summed up in a few words, "catch them and kill them," but the question which confronted the landholder was how to do the work cheaply and effectively. In the wheat-growing areas pollard baits distributed with the poison cart around each burrow, or by hand, gave very good results, especially when the work was followed up by filling in the burrows. Such work, however, should be repeated each day for about a fortnight. Another plan when first filling in the burrows, was to scatter baits close to the filled-in holes, so that the rabbits when scratching would pick up the baits. A more simple method could be used on grass land. Three or four horses should be hooked to a three-furrow plough with an eight or 10ft. length of chain. By that means the team could be driven around the worst part of the burrow, and the plough pulled through the land as deeply as possible. A few baits should then be scattered along the furrow. After using the plough, there would be plenty of loose dirt to fill in whatever holes the rabbits opened. Jam mixed with strychnine was also effective, especially if placed around the fence on sticks or stones after the holes had been blocked up. The fumigator, with a smoke mixture attachment, would also destroy a lot of rabbits. During recent years the use of petrol fumes from the exhaust of an engine had given good results. Some farmers were reported to be using motor cars for the same purpose. If the farmer carried out any of the above methods, it would be concluded that their paddocks were clear of rabbits, but, during the spring time, young rabbits were seen outside the paddocks, and where 1½ in. netting was used many of the burrows were opened again before the completion of harvest, and the same work had to be repeated. One way of avoiding that was to use 1½ in. netting. The poison cart should also be driven around the fences just as the grass was drying off, and around any burrows near the fence. A very good method in plain country, and where farmers had not been able to secure wire-netting, was to use the poison cart every three mouths around all the burrows, and also to roll up hand baits about the size of an egg, or smaller, and throw a few down each burrow. The destruction of rabbits on grazing land was more difficult than on cultivated land. The most effective way of dealing with the pest on such land was the use of the poison cart, which, if used with judgment at different times of the year, would keep the rabbits in check. Good effective work could be done during the summer months after showers of rain, and again when the first seasonable rains fell before the green grass appeared. The poison cart would also do effective work during July or August, and again later when the grass was drying off.

CUNGENA.

October 24th.—Present: 18 members and three visitors.

FALLOWING.—In the course of a paper dealing with this subject, Mr. E. T. Barrett stated that the purpose of fallowing was to store moisture in the soil and destroy weeds. Fallowing should be commenced in June and finished, if possible, by August. The writer contended that it was a waste of time to fallow the land when grass was in seed, because that would cause the weeds to be more troublesome. The best plan was to turn in the weeds when they were young. Before starting fallowing the plough should be set to cut the ground and expose all the roots of the weeds to the air. The writer advised ploughing first to a depth of 3 in., then working the surface soil to a depth of 2 in., care being taken not to disturb the underneath soil. An implement such as a set of harrows or a cultivator should be used for that work. The best time to work the fallow was when the land was wet, and, if possible, it should be cultivated after every rain. Seeding should not be commenced on the fallow until after the first winter rain. All fallow land should be worked in the opposite direction to the first ploughing. A general discussion followed.

MIXED FARMING.—Mr. O. H. Gerschowitz, in a paper dealing with this subject, contended that it was first of all necessary to grow a rotation of crops on new land. Three or four crops of wheat could be grown, and then a crop of oats or barley, to give the soil a rest. The last-named two cereals provided better grazing for stock the following year. Oats were also a means of checking take-all, and eaten stubble would burn much better than wheaten stubble. On a farm of, say, 1500 acres, one should carry about 300 sheep and a few cattle, as well as pigs and poultry. The farm should be well fenced and subdivided, provision being made for a good supply of water. The farm could then be used to the best advantage by sowing, say, 400 acres of wheat, 100 acres of oats, and 100 acres of barley. These crops should be sown early in the season and used for grazing the sheep and other stock during the early winter months, when other feed was scarce. In the spring of the year when feed became more plentiful, these crops could be left for harvesting. About 400 to 500 acres should be fallowed as soon as seeding was completed, leaving 400 to 500 acres for grazing purposes. If a larger number of stock were to be carried, it was a good plan to sow about 50 acres of rape on the fallow, to help carry the sheep through the summer months, and it would also serve as a good dressing for the fallow. Sheep on the farm were a profitable investment, because they provided meat and wool. On an average 200 sheep would return from 8s. to 10s. per head for wool, and if a few lambs were bred, say about 100, they could be sold or retained, and that number of aged ewes drafted out and sold. The best breed of sheep for wool production for that



district was the Merino, but for the owner breeding for lambs the writer recommended the Border Leicester or Shropshire crossed with the Merino. Sheep could also be run on the fallow to consolidate the soil, destroy weeds, and save labor in cultivation. A few cows were also necessary on the farm, first to provide milk and butter for the household, and secondly, for the weekly payments obtained for cream. If one were short-handed, however, it was only advisable to keep one or two cows. The writer next referred to pigs as a very useful asset, because they could be fed on the waste products of the farm. Pigs were useful for supplying meat for household use, or they could be marketed from time to time. In concluding, the writer referred to poultry as being a valuable side-line. The birds kept the household supplied with eggs, and were useful for table purposes, but the writer did not recommend the keeping of geese, turkeys, and ducks, because foxes were so numerous in that district. A general discussion followed.

GREEN PATCH (Average annual rainfall, 26.56in.).

November 26th.—Present: eight members and two visitors.

FODDER CROPS.—In the course of a discussion on this subject, members were unanimously of the opinion that if early feed was desired, it was advisable to sow oats at the rate of 1 bushel of seed and 1 cwt. of super immediately after the wheat crop had been harvested. The only working of that soil that was necessary was to run a spring-tooth cultivator over the wheat stubble before sowing the oats. In reply to a question from Mr. Schwerdt regarding the best method of feeding sheep during the winter months, Mr. E. Sage said sheep could be hand fed with straw, and do well; but immediately the new growth of green grass made an appearance, it was advisable to feed the sheep on good hay chaff which could be set out in small boxes or bag mangers. Mr. Schwerdt mentioned that he had found a mixture of rye and oats an excellent grazing crop for sheep.

MILTALIE (Average annual rainfall, 14.55in.).

September 16th.—Present: eight members and three visitors.

FARM MACHINERY.—Mr. D. P. Bagnell contributed a paper on this subject. The makers of present-day machinery, he said, deserved great credit for its class, size, and durability. A few years ago, farmers were content with a four or five furrow plough, a 11 or 13 row drill, or a 4ft. or 5ft. stripper, but at the present time there was a tendency to scrap the small implements because there was little or no sale for them, and labor was expensive. When the larger machinery came on the market, it was questioned whether it would possess the durability that was needed. The first makes of some classes of machinery were not up to the standard, but the Australian firms had an advantage over the overseas firms because they understood the various classes of soil, climate, etc. He did not favor most of the overseas makers' implements, because they did not possess the durability of the locally manufactured article. Mr. Bagnell then outlined the advantages and disadvantages of the different makes of ploughs, combined drill and cultivators, binders, strippers, harvesters, and reaper threshers. Continuing, he said there were many makes of engines suitable for the farm, but he thought that in time they would be supplanted by tractors, which were gradually making their way into the farming areas. For a farmer commencing operations, he would advise buying a heavy and powerful type of tractor, because it would not then be necessary to purchase horses, harness and a stationary engine, etc. A good discussion followed the reading of the paper.

MOUNT HOPE.

November 17th.—Present: 17 members.

MACHINE V. BLADE SHEARING.—The first homestead meeting of the Branch held during the year 1923 took place at Mr. F. Myers's residence on November 17th. After the garden and outbuildings had been inspected, tea was provided by Mrs. Myers. The meeting was continued in the evening, when the following paper dealing with the subject, "Machine v. Blade Shearing," was read by Mr. J. Doudle:—"With the class of Merino that is bred in this district, I think the machine, in skilled hands, is capable of taking off half to three-quarters of a pound more wool than the blades, and, apart from this advantage, the machine"

can be used with more safety both to the man and the sheep, because when the blades are used, even by very careful men, a serious accident can happen through the sheep getting its foot in the bows of the shears and dragging them through the shearer's hand. There is also a danger of the shearer stabbing his pen mate, because most blade shearers now use 'Yabberch' shears. It is easier for a young man to learn shearing with the machine than the blades. Any farmer that has an engine and, say, 1,000 sheep, will find that if he installs a shearing machine the outfit will be paid for in two years by the extra wool that will be obtained." In the discussion that followed Mr. R. Myers doubted the advisability of installing a machine in a small shed. Mr. H. Myers was convinced that blade shearing was better for the sheep than the machine.

WHEAT MOST SUITABLE FOR THE DISTRICT.—In the course of a short paper dealing with this subject, Mr. T. Speed, sen., expressed the opinion that Federation was the best wheat to grow for grain in that district. It stood up well, and was easily thrashed. King's Red was also a good yielding variety, but it was very hard wheat to reap and thrash. Marshall's No. 3 he considered to be the best hay wheat. Gluyas was another good variety, but it had a tendency to "go down" if rough weather was experienced. Leak's Rustproof, whilst being a good yielder, was very subject to blight. A short discussion followed.

WIRRULLA.

September 22nd.—Present: 15 members and six visitors.

QUESTION BOX.—The meeting took the form of a "Question Box," the first subject brought forward was:—"At what period should an oats crop be cut for hay?" Members agreed that the crop should be cut when the grain was ripe. "The best plain to adopt to kill small mallee shoots?" Members considered fire the best method of coping with shoots. "Is it advisable to sprinkle salt on hay when stacking the sheaves?" All members agreed that it was. "What is the best means to prevent the ravages of white ants in house timber, sheds, posts,

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etc.," Mr. R. D. Burke recommended putting salt around the posts when they were erected. Mr. W. A. Mudge stated that he had checked the pest with the use of bluestone. Others recommended spraying with a solution of arsenic. "What is the quickest and best way of reaping and cleaning 300 acres of crop yielding 15 bushels per acre?" Members were divided in their opinions, some favoring strippers and winnowers; others, various styles of harvesters. In reply to a question regarding the best method of treating lampus in horses, Mr. B. Penna said he had found it a good plan to turn the affected horses on to green wheat. "Does sowing wheat dry prevent smut?" Members considered that in the event of smut in the crop it was advisable to pickle. "Which is the best wheat to cut for hay?" Members advocated Florence, Felix, or Gluyas. "Is it advisable to leach new cornsacks?" Some members were in favor of the suggestion, whilst others spoke against it.

WOOKATA.

November 24th.—Present: 13 members and two visitors.

STACK BUILDING.—Mr. J. H. Murray read the following paper:—"One of the first points that required consideration prior to building the stack is to see that the hay frame is sound and firmly fixed to the wagon. It is also advisable to see that the hay forks are in good order, because nothing is more annoying than to have to pitch hay with a loose headed fork. Regarding the stack, the first thing to consider is the site. This should be situated as closely to the stables as possible, at the same time leaving sufficient room to approach the stack on all sides with a load of hay. Having made a rough estimate of the quantity of hay to be stacked, the four corners of the stack can be pegged, care being taken to have the sides and ends the same length and the corners square, otherwise it will be found that the stack will settle down unevenly. Next, the piece of pegged ground should be covered with dunnage, such as old timber, logs, scrub brush, and straw; but I prefer large stones, because they make a good solid foundation. The first layer in the stack is the foundation, and care must be taken to see that this is put down firmly and evenly, otherwise it will lead to subsequent trouble. First make a start on the outside row, which is the wall, by placing the sheaves butts out on their edge, and proceed around the stack to the starting point, carefully pressing every sheaf down firmly with the knee to make the wall solid. Now proceed to fill the middle. Continue as with the wall, but reverse the sheaves, with the heads just covering the hinds of the wall sheaves. Place all centre sheaves on the flat, and continue this operation until the centre is completed, taking care to keep the middle well filled, because that is most necessary to run out the water, should any find its way into the stack. The second row is continued as with the first, but in the opposite direction to the one directly underneath. To obtain a straight wall the wall sheaves should be placed about 2in. to 3in. inside of the layer underneath, when it will be noticed that by the time the middle is filled they will have been pushed out level with the layer underneath. To obtain a wall with a steep slope out at the top, all that is necessary is to place the wall sheaves level with the last layer. This, however, should not be done unless long hay is being handled. Continue layer after layer until the top of the wall is reached. Now proceed to put on the eaves and the roof. The eaves first, by placing the sheaves on the flat, about 3in. to 4in. over the sides of the wall, right around the stack. Then fill the middle to at least 3ft. higher than the eaves. The roof is the most important work, and a little extra time and care taken is time well spent. Start by placing the first layer butts out on the flat of the sheaf, well covering the binds of the eaves, and working in the opposite direction to that in which the eaves were formed. Now fill the centre as before, carefully pressing every sheaf in the roof down firmly. Continue on until near the ridge, and if during the stacking some of the short sheaves have been put aside, they will come in handy to finish off the ridge. A good plan is to peg down the ridge, because these sheaves seem to always get out of place. Now that the stack has been finished, I advise thatching; failing that, I would cover the stack with a good layer of clean straw and peg it down with string, or cover it with old netting, to keep it from blowing off. This can be rolled up a little at a time when required."

CARROW, November 23rd.—A large number of members and visitors attended the concluding meeting of the year, which took the form of a social evening.

GREEN PATCH, October 22nd.—Mr. E. M. Sage read a paper, "Results of Cropping," in which he gave an account of various tests that he had conducted on his farm. Mr. C. J. Whillas then gave a report of the proceedings of the Minnopa Conference.

LAKE WANGARY, November 5th.—The Assistant Wool Instructor of the school of Mines (Mr. C. A. Goddard) attended the meeting, and delivered an address, "Classification of the Farmer's Woolclip." Practical wool-classing demonstrations were also given at Messrs. Morgan's and Hawke's sheds.

McLACHLAN, November 3rd.—Mr. T. Puckridge read a paper, "Fallowing and Its Benefits." The speaker dealt with the subject from the point of view of the stimulating effect the breaking up of the land had on the activity of soil bacteria, and the making available of food suitable for the wheat plant. An interesting discussion followed.

McLACHLAN, December 1st.—Mr. G. P. Roe delivered an address, "Heavy v. Light Harvesting Machinery," and a keen discussion followed. The question of commencing crop and fallow competitions was also brought before the meeting.

MILTALIE, November 17th.—The report of the committee of management of the local crop competitions was received. The report showed that the judging was carried out by two local farmers, and so far as could be gathered every satisfaction was given on all sides. There were 15 entries, and six competitors' crops were judged. Mr. C. C. Wake, of Elbow Hill, won highest honors, with 75 out of 100 points. Two members of this Branch secured second and third prizes.

POOCHERA, December 8th.—Ten members and three visitors attended the inaugural meeting of the Poochera Branch of the Agricultural Bureau, which was held in the local hall on December 8th. The Manager of the Minnopa Experimental Farm was present and delivered an address.

STREAKY BAY, November 10th.—The subject, "The Advantages of Membership of the Agricultural Bureau," was brought before the meeting, and an interesting discussion ensued.

EASTERN DISTRICT.

BRINKLEY.

October 25th.—Present: 16 members.

ROTATION OF CROPS.—The monthly meeting of the branch was held at Mr. E. W. Pearsons' homestead. During the afternoon members were afforded an opportunity of inspecting the crops, stock, and farm buildings, special interest being taken in the manual experimental plots being carried out under Mr. Pearsons' supervision. Mr. R. H. Lamney also gave a demonstration with a farm tractor. Mr. A. W. Richards, who contributed a paper dealing with the subject, "Rotation of Crops," said owing to the high prices of all farm implements, labor, &c., and the prospects of lower prices ruling for wheat in the near future, it was necessary for farmers to try to increase the production of both crops and stock. The best method by which that could be done was to adopt a system of rotation of crops, which would mean increased production without reducing the fertility of the soil. He had no hesitation in saying that the better working of the land and the application of heavier dressings of fertilisers would have the desired effect. A good rotation would be bare fallow, wheat, followed by a crop of barley or oats. Wheat could safely be followed by one of those crops, or, if desired, peas could be sown on a portion of the stubble, and the land then thrown out for pasture. The stubble should be burnt, because the fire helped to sweeten the soil and check take-all. Next, the land should be ploughed to a depth of about 2in., and if peas were grown on portion of the stubble, pigs and sheep could be profitably fattened. The droppings from the stock, and the nitrogen stored in the soil by the peas, would enrich the land for the next crop, which should be one of the cereals. Peas should

not be sown on the same land two years in succession. Farmyard manure should not be applied to a crop, but should be spread over land that was to be fallowed. By adopting a system of rotation, they would be able to check the spread of plant diseases, especially take-all, and keep the land cleaner, and increase the stock-carrying capacity of the farm.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

October 20th.—Present: 19 members and three visitors.

POINTS FOR FARMERS.—Mr. W. Braendler, who read a paper under the heading "Don't Forget," said the farmer should commence work at a reasonable hour in the morning, feed the horses, milk the cows, and then feed the separated milk to the pigs. Stock which was kept in the stable over night should be bedded down, and the horses before being harnessed should be thoroughly groomed. Feeding the horses with large quantities of raw oats should be avoided. Shelter should be provided in the paddocks for all stock. In arranging the teams for working in the field, due allowance should be made on the swings if a small horse were worked alongside a larger animal, and when carting on metal roads horses with tender feet should be given a spell. All machinery should be kept under cover, and oiled or greased at regular intervals. Fences should be kept in good repair. Prior to the commencement of fallowing, the plough should be examined, and the mouldboards set at the right angle to turn over the soil completely. The fallow should be cultivated when weeds made an appearance, and working the land after a fall of rain would assist in conserving moisture. Sheep should be crutched at least twice a year, and also dipped. If the standard of the flock was to be maintained or raised, the farmer should purchase the best ram with the means at his disposal. Rabbits were a source of constant trouble on the majority of farms; they destroyed valuable feed, and when poisoned provided a breeding place for blowflies. The speaker strongly advocated the use of the fumigator for rabbit destruction. The blacksmith's shop was a most necessary part of the equipment of every farm. It should contain an assortment of bolts, nuts, rivets, &c. Harness should be greased at regular intervals. It was a good plan to order the cornsacks for the coming harvest some little time beforehand. The household should be kept supplied with water and chopped firewood. The stables should be regularly cleaned out, and the poultry houses and pigsties disinfected. In conclusion, the speaker stated that members of the Bureau should not forget to attend regularly the meetings of the Branch, to take an active part in the work, and induce new members to join.

MOOROOK.

November 29th.—Present: 10 members.

QUESTION BOX.—The meeting took the form of a "Question Box." The first question brought forward for consideration was:—"Is lucerne growing between the rows of young vines detrimental to the vines?" It was considered that although the lucerne might check hot winds and drift, the benefits gained were more than counterbalanced by the loss of vigor of the vines in subsequent years. 2. "Is cultivating the furrows after watering as good as ploughing in?" After a good discussion it was decided that the best method would depend upon conditions. Should the ground be loose and friable to a greater depth than the bottom of the furrows, the cultivator would do the work satisfactorily; but if the land had a tendency to "hard pan," then it was necessary to use the plough. 3. "Should a drying rack have an iron roof?" In the opinion of those present an iron roof was of no advantage to a rack in this district. Mr. S. Sanders had only experienced one very bad season, and in that instance the fruit under the iron roof suffered as much as that on the open rack, owing to the humid conditions. 4. "How much superphosphate should vines in full bearing receive annually?" It was thought that from 2cwt. to 3cwt. of super used in conjunction with other fertilisers and green manure would be sufficient to keep the vines in good heart; but super alone could not be relied upon to produce good crops. 5. "What is the best method of trellising Sultanas?" Though some growers obtained good results from the two-wire system, it was generally considered that the three-wire on a flat trellis would produce the best crops. The bottom wire should be 2ft. 3in. from the ground, the second wire 6in. above that, and the top wire 9in. above the second. The vine should be trained on the middle wire, and some of

the canes depressed to the bottom wire. The top wire had only to support the summer growth. Mr. Gray was strongly in favor of that system, contending that it was not necessary to leave so many spurs as with the two-wire system, and also the vines showed a much better "burst".

PARILLA (Average annual rainfall, 16in. to 17in.).

October 19th.—Present: 11 members and visitors.

CARE OF HARNESS AND FARM MACHINERY.—Mr. J. A. Mann, who read a short paper dealing with this subject, said neglect of the harness resulted in the loss of a considerable sum of money on a farm where a large number of horses was worked. In the first place, a pound spent in oil for harness every year was money well spent. The leather would be preserved and its life of usefulness would be considerably lengthened by the dressing of oil. Another point was to have proper places in which to keep the harness under cover. Farm machinery required constant attention, if it was to be kept in proper repair. Every machine should be put in good working order before it was sent into the field. Seeding and harvesting were the two busiest periods of the year on the farm, and the farmers could not afford to lose any valuable time when the crops were ripe, therefore he should give all the machines a good overhauling. All worn-out parts should be replaced with new ones. The binder knives should be sharpened and the fingers removed if the edges were worn. By keeping the knife track well oiled and the knife free from any clogging material, the machine would run smoothly. It was a good plan to have a drum of water in the paddock and put water on the knife each time it was driven around the field. The harvester should receive special attention, particularly the comb and winnower. The comb should be closed if needed, so that it would strip the crop clean, and the winnower and elevator should be so regulated that they did not lose any grain.

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RENMARK.

October 25th.—Present: 30 members and four visitors.

ORCHARD AND VINEYARD SPRAYING.—The following paper was contributed by Mr. C. S. Ruston:—"The first spraying for codlin moth should take place as soon as the great majority of the flower petals have fallen. This should be followed by a second calyx spraying after an interval of about 10 days. The performance of these two calyx sprays at the correct time is of vital importance in the attempt to control the codlin moth, which, incidentally, is very much in evidence this year. Future sprayings in badly affected orchards should be given at intervals of two or three weeks. The majority of growers use arsenate of lead in paste form. The general proportion is 20galls. to 1lb. I would, however, recommend that the strength be slightly increased, even up to 15 to 1. The quality of arsenate is determined by the suspension test, which means the length of time the minute particles remain suspended in water at a given strength. This depends on the fineness of the material used. The use of casein with arsenate of lead, as a spreader, is to be very highly recommended; the proportion the same as for Bordeaux mixture—5ozs. to 50galls. Casein used in stronger proportions, up to 8oz. or 10oz. to 50galls., has a good effect on red spider, its action being simply to stick him fast. *Combined Sprays for Pear Trees.*—It is quite safe to use Bordeaux mixture in conjunction with arsenate of lead where there is any sign of fusieladium. A combined arsenate and scalecide also is possible, though, as a general rule, the best time to spray for scale is just before the buds burst, when scalecides can be used at a much greater strength, and are much more effective. Care should be taken that no soap is used in any way in conjunction with either arsenate of lead or Bordeaux, nor should the Bordeaux be an ammoniacal solution of copper. Arsenate of lead requires a fine spray; red oil and nicotine a coarse one. *Notes.*—There are two main reasons for the use of copper sprays on vines—the one as a check for anthracnose, already established, and the other a purely preventive spray against downy mildew. The sprays used in both cases are identical; the variation comes only in the frequency of the application. Whilst in normal years two sprayings may be ample as a preventive, five may be necessary in the case of areas badly affected with anthracnose. *Bordeaux and Burgundy Mixtures.*—The generally adopted formula for Bordeaux is eight copper sulphate, four lime, and 40 water, and the solution should contain a slight excess of lime. This year, however, there have come on the market two makes of ready-made and mixed powders that simply require the addition of water, and they are ready for use. The French variety has been used in France for nearly 25 years, and is considered to be quite reliable both against anthracnose and downy mildew. In composition it seems to approach very nearly our homemade Burgundy mixture, and evidently contains a spreader of some sort. I have found this spray a little liable to scorch, and on testing samples from two 56lb. tins found them both giving a lightly acid reaction. The use of casein with this mixture, though not strictly necessary, is well worth while. In dissolving the powder I have found it advisable not to do so in the vat, because there is a fair amount of gritty residue left in the bottom. Also, if added too quickly to water, or with insufficient stirring, it will go into insoluble lumps. I have also found it impossible to make the powder into a very concentrated solution; from ½lb. to ¾lb. of powder to a gallon of water is about the maximum—stronger than that it starts frothing. I have only noticed very slight scorching of young growth in sultanas, and none at all in the case of currants. The other powder now obtainable is made locally. The proportion necessary to use is much smaller than the French, and it is certainly much easier to handle, besides being less costly." The writer of the paper then read a lengthy communication from the manufacturers of these powders, and the paper continued:—"Oidium.—Sulphur may be added to Bordeaux mixture with quite satisfactory results. The quantity of sulphur used depends on its fineness, i.e., the finer the sulphur the less required—from 7lbs. to 10lbs. of sulphur to 50galls. of spray. Mix as follows:—Make a casein solution. Take ½gall. and place it in a hand basin. Add the sulphur and mix with a rotary egg beater. The casein wets the sulphur much more readily than water will, besides having the effect of sticking the sulphur firmly on the vine. The disadvantages are that it requires greater agitation than a hand spray provides, and has a habit of accumulating in a solid mass at the bottom of the vat. To make the casein solution use 5ozs. casein, 4oz. caustic soda, ½gall. boiling water. This will be sufficient for 50galls. of Bordeaux mixture. As a remedy for a sudden outbreak of oidium, Mr. de Castella recommends a

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spraying of 14lbs. potash permanganate to 100galls. of water. This is instantaneous in its action, but not lasting, and should be followed by sulphur. Its value lies in not requiring any warmth before it takes effect. Oidium is the one form of vine fungi that does not require water in which to germinate the spores; hence, air is sufficient. Lime sulphur, in the proportion of 10 to one applied to areas badly affected by oidium just before the bud bursts, should be very beneficial, and can be applied later at a much diluted strength (30 to 1) in cold, calm weather, but this should not be attempted with anything like high or even moderately high temperatures. It must be used with great caution. When using Bordeaux mixture, empty the spray completely once a day, and flush out. When spraying is finished for the time fill the vat with water, and pump water through the hose and nozzles, thus preventing copper deposits on the interior of the pipes and hoses, which peel off when dry, and cause immediate chokes in the nozzles. It is important to renew discs as soon as the holes become worn, or if the spray becomes coarse, resulting in inefficiency and extravagance." The Paper Discussed.—Following the reading of the paper, Mr. Ruston, in reply to a question, said the indications were that the codlin moth would be bad this year, as he had seen a hole of eggs on the leaves. Mr. F. H. Basey said he was using a spray of one in 16 for his pear trees, and proposed spraying fortnightly if possible. He was using casein as a spreader, and his method was to mix 35ozs. of casein with 3½ozs. of caustic soda to 3½galls. of water, using 1gall. of the mixture to every 50galls. of spray. It was necessary to mix it very slowly. As to the spray discs, they should be renewed when the holes became worn, because the fineness of the spray was affected. He believed a number of growers were using glass discs, and understood they were very effective. Mr. H. R. Little had told him that his practice was to cover the hole with solder and drill a new hole. That made the disc practically everlasting. One of the most important things to consider in preparing a spray was the effective straining of the water and mixture into a vat. An excellent method had been devised by Mr. J. W. Johnson, who took a lubrication oil tin and cut the two ends out, soldering a gauze bottom on one end. A petrol tin was then opened sideways, and the oil tin soldered into the bottom. The water ran through that almost as fast as it could be poured or pumped in, and it made a handy and effective sieve. Mr. Weste asked what Mr. Ruston would recommend as the best treatment for an attack of oidium—the dry sulphur or spray? Mr. Ruston said that sulphur could be used in Bordeaux mixture, or for a sudden outbreak 14lbs. permanganate of potash to 100galls. of water was most effective. He believed that black sulphur would have a good effect, but it was difficult to get. Mr. Olorenshaw said that he was using black sulphur at the present time; it was easily dissolved in water. Mr. Ruston thought that if that was so, it should be easily mixed with Bordeaux mixture. He understood that some years ago, while he was away from Renmark, a suggestion had been made that a levy should be struck to enable the Bureau to be associated with the Mildura Research Committee. That appeared to him to be an excellent suggestion, and he would like to know whether the matter could again be taken up. Mr. Basey said that at the time the suggestion was made the Bureau was unwilling, as they thought any necessary experiments or inquiries could be made at the Berri orchard. Mr. Croft asked for advice on the best way of applying dry sulphur, on the ground or on the vine. Mr. Basey recommended that it should be shaken on to the vine, and some should be left on the crown; a certain quantity would, of course, reach the ground. Mr. Olorenshaw said he put sulphur on the vines, and in the ground too. He had a block that had once been eaten out with oidium, and since he started using plenty of sulphur there had been no further trace of it. The sulphur was well mixed with the soil, and on hot days his block was a mass of fumes. He thought the Berri orchard should prove the value of sulphur. Mr. Basey replied that Mr. Savage was anxious to receive suggestions whereby he might assist growers, and had agreed to test the ploughing in of sulphur, and the use of muriate of potash. He would warn them that dry sulphur should not be used during high temperatures.

WILKAWATT (Average annual rainfall, 16in. to 17in.).

September 21st.—Present: seven members.

Mr. F. R. Koch (Hon. Secretary) read a paper, "Most Suitable Implements for the District," and an interesting discussion followed.

HAY MAKING.—In the course of a paper dealing with this subject, Mr. G. Oranu said in that district oats should be relied upon to provide the horse feed. That was generally recognised, but the varieties usually grown—Cape or Algerian—ripened late in the season, and often the hay had to be left out in the paddock until the completion of the wheat harvest. Serious loss might result if those varieties made rank growth and were cut too early, because the hay would be bitter. Generally speaking, hay could be cut earlier on new ground than on old. Cape and Algerian oats could be cut with advantage even when nearly quite ripe, especially if fed as chaff. It was not advisable to commence cutting until about half the straw showed a purple color. He recommended the growing of earlier varieties, such as Scotch Grey, which could be cut on the green side, to supply, say, half the hay crop. The growing of earlier varieties should ensure getting the hay in before the wheat was ready for harvesting. The speaker expressed a preference for the round stook of about 24 sheaves, and the hay could be stooked so soon as the man on the binder had enough down to give the stooker a fair staff. Some people preferred to leave the hay on the ground for a few days, but he did not see that there was any advantage in that practice, because hay properly stooked would “make” or dry out nicely and with good color. Rain had a very bad effect on hay, so that the sheaves should be stooked as soon as possible, and carted away without any delay after it was ready. It should be carted after being in the stooks eight or 10 days. A good, dry foundation should be made for the stack. Mallee roots would be suitable, as they would permit of a certain amount of air circulation. The use of old straw was not to be recommended, because it was liable to cause dampness to creep into the stack. He preferred building with the butts outwards all through the stack. The outside rows should be placed on edge, and the second row should just clip the heads of the outside sheaves. The next and succeeding rows should be placed out to the bands, which would keep the centre of the stack well raised. Care should be taken not to walk near the edge of the stack. Any loose hay should be raked off the edges on to the middle, and the same practice continued until the eaves were built. A roof built with the heads of the sheaves outwards would run the rain off better if no straw was used, but if the roof was continued with the butts outwards straw would keep on the roof, and the top of the stack would be better preserved than if built with the heads outwards.

On November 2nd members made a tour of inspection of the district, and visited the farms of Messrs. Koch, Philips, and Neville.

BARMERA, November 19th.—Mr. E. Muspratt (Irrigation Instructor and Inspector) attended the meeting and delivered an address, “Rack Building.” On December 10th the Deputy Horticultural Instructor and Manager of the Berri Experimental Orchard (Mr. C. G. Savage) gave pruning demonstrations in the orchards of Messrs. H. Anthony and D. Brookes. In the evening Mr. Savage addressed the members on several subjects relating to “Block Management.”

BERRI, December 4th.—A meeting of the Branch was held at the Government Orchard, on the above date, when there was an excellent attendance of members and visitors from neighboring Branches of the Bureau. A further meeting was held on December 5th. The Director of Agriculture (Professor Arthur J. Perkins) was present, and delivered an address, “Fertilisers and Soils.” The Horticultural Instructor (Mr. George Quinn) was also present and dealt with the subject, “Export of Grapes.”

GERANIUM, November 6th.—Mr. A. H. Robin, B.V.Sc. (Government Veterinary Officer) attended the meeting and delivered an address. On the following morning Mr. Robin gave a demonstration, “The Points of the Horse,” and diagnosed the complaints of several animals brought forward for his inspection.

GLOSSOP, November 21st.—On November 21st 20 members and a large number of visitors met at Mr. Hatch’s block and inspected the vineyard. Mr. C. G. Savage (Deputy Horticultural Instructor and Manager of the Berri Experimental Orchard) was present, and gave a demonstration of summer pruning and budding. In the evening Mr. Savage delivered an address, “Cultivation and Manures.”

MARAMA, November 22nd.—Eighteen members and a large number of visitors, including several ladies, were present at the November meeting of the Branch, when the Assistant Dairy Expert (Mr. H. J. Apps) delivered an address and gave a demonstration of milk and cream testing.

MONARTO, SOUTH, November 17th.—A paper from the *Journal of Agriculture*, "Economics on the Farm," was read by the Hon. Secretary (Mr. C. P. Altmann), and an interesting discussion ensued.

MYPOLOGA, November 19th.—On the afternoon of November 19th Mr. H. Wicks (member of the Advisory Board of Agriculture) gave a pruning demonstrations on the orchards of Messrs. Linke and Dowding. A meeting was also held on the evening of the 19th, when an address, "Citrus Culture," was given by Mr. Wicks.

NETHERTON.—On November 14th the Assistant Dairy Expert (Mr. H. J. Apps) attended a meeting of the above Branch, and delivered an address, "Dairying," to a gathering of 12 members and a large number of visitors.

PARILLA, September 21st.—A paper dealing with the subject "Fallowing" was read by the Hon. Secretary (Mr. C. S. Foail), and an interesting discussion ensued.

SOUTH AND HILLS DISTRICT.

CURRENCY CREEK.

October 26th.—Present: 11 members and visitors.

MILKING MACHINES.—In the course of a paper dealing with this subject, Mr. J. W. Pitt contended that the milking machine was one of the greatest time and labor-saving machines that had been introduced to the dairy farm, because it was used twice every day throughout the year, and thus it was different from the many other costly machines which were used for a few weeks, and then put into the shed until the next season. With a two-unit milking plant one man could milk 24 cows per hour and separate the milk at the same time, at a cost in petrol and oil of 4d. per hour. With a man and a boy and a larger plant, the number of cows per hour would be proportionately increased and the cost reduced. One difficulty with hand milking, apart from time and labor, and especially with hired labor, was to retain the same man year after year. That meant a change of methods, which militated against maximum results. Another point was that of sore teats, which with some cows were a great trouble. The difficulty of milking by hand a cow with a bad barb-wire cut on the teat was also known, but an injury of that nature caused very little trouble with the machine. The cows settled down to being milked by the machine from the very first and stood more quietly, rarely needing a leg-ropes, and they were also cleaner in the bail, showing that they thoroughly appreciated the machine. The best time to set up a milking plant was before the cows came in. They should be put on the machine when in full milk, when they would respond better than if put on as strippers. The best results were obtained from heifers just in, for they often milked perfectly dry, thereby doing away entirely with stripping. It was most important that the milking machine should be kept thoroughly clean. A couple of gallons of warm water should be run through the machine directly it was taken off the cow. Once a day the cups should be dipped two or three times in hot or boiling water in which a piece of soda had been dissolved. All the milk tubes should be taken to pieces and washed in warm water and soda, and cleaned with the small brushes supplied for the purpose, and being taken to put the machine straight from the cow into the water. In the discussion which followed, Mr. Saltmarsh emphasised the importance of cleanliness as advised by Mr. Pitt. Mr. Ritchie favored machines as being cleaner than handmilking, especially the overhead system. In reply to a question Mr. Pitt said he did not think soda injured the rubbers in any way.

CURRENCY CREEK.

September 21st.—Present: five members.

SHEARING AND PREPARING A SMALL CLIP.—The following paper was read by Mr. D. J. Gordon—"Shearing should commence at the start of the warm weather, before grass weeds begin to drop. Clean the shed thoroughly, and if it is not a permanent building with yards, erect hurdles for the pens that are required, seeing that the catching-pen is adjacent to the board and in the most convenient place for the shearers to catch the sheep. Have a pen in which to turn the sheep after they are shorn. It is a good plan to have a swing gate across the pen, just touching both sides of the entrance, so that whichever way the gate is pushed when

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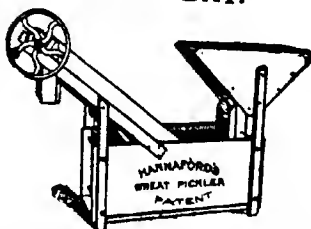
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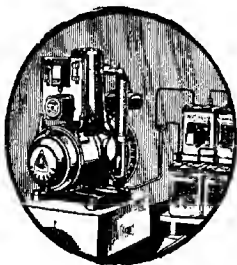
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the shearer has caught a sheep the gate will then close unaided, leaving the other pen open and a clear run for the shorn sheep. Ample provision should also be made for housing sheep in the event of rain. A sufficient number of hands should be engaged, so that the shearer has nothing to do but attend to shearing. Wool-picking and clearing up should be done by other hands. The farmer himself should be able to shear, because it is often very difficult to get shearers at just the right time, and in addition to that, the practical man will have a better idea of how his sheep should be shorn. The board should always be kept clean, the broom being freely used after each fleece has been picked up, so that no locks or second cuts may get into the next fleece. Second cuts must be avoided as much as possible, because they are practically valueless. The fleece should be picked up by taking hold of that portion of the wool that has been removed from the two hind legs or breech of the sheep, then with an inward scooping movement of both hands, the fleece should be ready for carrying to the table. To place it on the table it should be thrown outwards and slightly upwards, when the wool should spread over the table like a blanket, leaving the shorn side facing downwards. Skirting.—If the wool is clean and free from burrs, nothing more is needed than to take off the stained and sweaty edges. If, however, there are burry pieces they should be removed, but do not take off burry pieces at the edges and leave burrs on other parts of the fleece. If the fleece is badly affected with burrs, it is far better to pack the whole lot together and take the lesser price for burry wool. In rolling, the sides should be turned in, the one farthest from the operator slightly more than the other, and the fleece rolled from breech to shoulder. This will bring the best wool, that of the shoulder, uppermost. Class out any faulty fleeces, such as those consisting of extra short-stapled, fatty, tender, yellow, or discolored wool. It is a mistake to over-class a small clip, making it into 'star lots,' and thereby expecting to obtain a high price for one line. A good average price will pay the best. In baling the wool, see that the bales are as even in weight as possible, for, like all goods, the wool should be prepared in such a manner that it will please the eye of the buyer. In branding it is advisable to have proper lettering and neatly-branded bales. A distinctive brand shows the clip off to advantage. It is also important that the bales be branded on the top and front, leaving the bottom for the buyer's mark and the port of destination. If possible, avoid making mixed bales. It is better to send the oddments in bags for reclassing by the brokers. If mixing cannot be unavowedly advise the buyers of the number of bales and any enclosure, such as ram's wool, &c. I would advise farmers to keep to the one kind of sheep, thereby making their parcel as large as possible and avoiding so many 'star' lots, which mean less money to the grower." In the discussion that followed, Mr. Shipway asked if the writer advised taking out the bellies when only a few were shorn. Mr. Gordon replied in the affirmative and said the bellies should be removed if only 20 sheep were handled. Mr. Fidoek asked the measurements of a good rolling-table. Mr. Gordon advised:—"Eight feet long by 4ft. wide, with broom handles let in to holes bored through the sides, with sufficient room allowed between each to enable the handles to revolve."

LENSWOOD AND FOREST RANGE (Average annual rainfall, 35in. to 40in.
October 15th.—Present: 12 members.

EFFECTIVE SPRAYING.—The following paper was read by Mr. L. Green:—"For effective spraying it is necessary to have a pump that is capable of throwing a continuous spray at a strong pressure. The pump should always be kept in thorough working order, and ready to be used at any time. Through the winter the outfit should be thoroughly overhauled, and repairs attended to, and not left until the trees required spraying. The first spraying should be given when the first blooms opened. This spray should be applied as each variety of fruit reaches the stage just mentioned. Bluestone solutions have proved to be more effective when used at the blooming stage than other sprays, but care should be taken not to use too strong a mixture. Bluestone solutions should not be used after the bloom has fallen, for in most cases where it has been tried the cure has been as bad as the complaint. After the bloom has fallen, and before the eye of the apple has closed, a spraying of arsenate of lead and lime sulphur should be used. About a fortnight later, I favor spraying again with the same mixture, and then again early in December. The grower who sprays often, and keeps a

plum on the fruit all through the season, has a far better chance of having clean fruit if the weather changes and sets in favorable for the development of scab, than the grower who has to wait for the weather to clear before he can spray. Towards the end of January a further spraying of lead should be applied. During an average season, no further spraying is needed, but if a dry summer and autumn are experienced a later spraying of lead will prove profitable on late ripening varieties. All spraying should be applied with a good continuous pressure. The sprayer should always aim at getting a fine misty spray. Care should always be taken in the mixing of sprays, and the work carried out according to the directions supplied by the makers." Mr. Lawrance then read a paper entitled, "Machinery in the Garden."

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

November 20th.—Present: eight members and visitors.

THE CROW PEST.—The monthly meeting of the Branch was held at Mr. A. J. Nicholls's homestead, when the following paper, dealing with the above subject, was read by Mr. A. Brumby:—"One of the worst pests of the man on the land on Kangaroo Island is the crow. This bird is very destructive at seeding time, because it unearths the seed after it is drilled in, and also pulls up the grain after it shoots, for the soft grain at the root. It is a source of worry at lambing time, and pecks the eyes out of the young lambs and ewes when they are down. The best way of destroying it that I have tried is by trapping. The trap is made as follows, and the cost is very small if poles are obtained from the scrub, in fact the only cost is the wire netting and a piece of No. 8 wire for securing the ends of the poles. Obtain four stout poles 7ft. 6in. long for the corners, point them and drive them 18in. in the ground, 8ft. apart, to form a square.

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Then bore a hole in the top of each upright, and brace four poles 9ft. long to the top of the corner posts with wire. Two of these poles act as wall plates on the ends, and two as roosts for the crows flying on to the trap. Then two poles are required, long enough to reach from the top of the corner post to the bottom of the opposite post, near the ground, which forms a triangle. Secure these poles by wire twitches, and the top and bottom of each upright, which holds the trap firmly in position. Two pieces of netting 3ft. x 1½in. mesh will cover the frame, each piece being 3½ft. long. A ladder made of two poles 9ft. long is placed horizontally at the apex of the triangle. The ladder is composed of 10 rungs 9in. apart, five rungs on each end, and a distance of 18in. between the two rungs in the centre to provide for the entrance of the crows. Three rungs on each end should be covered with wire netting on the under side to keep the birds from escaping. Two roosts 9ft. long made of light poles should be placed 18in. above the apex of the triangle inside the trap, on to which the birds can fly. To bait the trap place a carcass of a sheep or lamb just below the opening in the centre of the apex of the triangle, and place the skin on the outside end of the trap for an attraction. The decoy crows should have both wings cut; about four decoys will be sufficient, and they should be well fed and watered. No dead crows should be left lying about. The traps should be built near trees or any place on the farm frequented by the birds. The best time to catch crows is in the winter and spring of the year, when they are hungry."

McLAREN FLAT.

October 26th.—Present: 58 members and two visitors.

THE CARE AND TREATMENT OF THE HORSE.—The following paper was read by Mr. L. Hussey:—"With horses as with all other stock, breeding is one of the most important points to consider, consequently I would rather advise a man to invest in three well-bred horses than five mongrels. For utility, I prefer a medium, active draught, to a heavy Clydesdale or Shire horse, because feed and time will be saved, and one will obtain a maximum of efficiency with a minimum of cost. I consider that small feeds and often are far more beneficial than throwing in a bag of chaff to save a little trouble. Any horse can work well on five kerosine tins of chaff a day—one for breakfast, one for dinner, one for tea, and two for supper. I would add to his feed occasionally a little bran, and sometimes a few oats. If possible, lucerne should be fed in small quantities, more particularly as a medicine than as a fodder. It is necessary for a horse always to have water at its disposal: a running stream if possible, but, failing that, a good trough, supplied from a slightly brackish well. Before starting a long journey I greatly disfavor giving a horse a big drink, besides making it most uncomfortable it is apt to cause scouring. A horse should never be harnessed with the sweat of yesterday upon it; nothing is more conducive to sore shoulders and girth galls. Always brush the shoulders before adjusting the collar, and, if possible, bathe them with warm water. A horse needs one and a half hours for dinner, all the harness being removed. Always see that the harness fits properly. I am adverse to using chain traces, and much prefer the flat leather ones with links to fasten to the hames, and chains for the spreader or swing bar. I also advocate the open bridle. The housing of stock is a most important factor, and for our climate I favor heavy wood walls with a thatched roof, and a strong wirenetting door to keep out the fowls. Always tie the team up during feed times, because some horses eat more quickly than others, and when they finish their own, drive the slower eaters away from their feed. The stables should be cleaned out every morning. I favor dry straw for bedding."

FRUIT CULTURE.—The following paper was contributed by the President of the Kangarilla Branch (Mr. R. G. Morphet):—"In dealing with this subject I propose to speak of apples, pears, apricots, peaches, and prunes. In preparing the orchard, lay it out the way the ground can best be worked, and plant the trees diagonally. This will give about 20 trees more to the acre when planted 20ft. by 20ft. than when planted on the square, and another advantage is that the full distance is obtained three ways between the rows, whereas on the square only two ways can be worked. Always secure the best varieties of trees from a firm upon whom you can depend, or, better still, select buds or grafts from trees that are good."

growers, and send them to the firm from you intend purchasing the trees, and have them budded with your own buds. It is not advisable to have too many varieties of the same sort of fruit, three or four at the most, and be sure to obtain the varieties that will suit your district. I suggest the following varieties:—Apples—Jonathan, King David, Dunn's Seedling (or Munro's Favorite), Cleopatra, Rome Beauty. Apricots—Late Moorpark, Royal. The Royal is a splendid canning variety. Pears—Duchess, Packer's Triumph, Beurre Bosc, Winter Nolis. Peaches—Freestone, white flesh—Brigg's Red May, Royal George, Sea Eagle, Mountain Rose; freestone, yellow flesh—Elberta, Salwey; clingstone, canning varieties—Stump, Pullar's, Liberty, Golden Queen. Prunes—D'Agen, Splendour, Prince Engelbert. In pruning apples, do not prune too hard when the trees are young. Only prune enough to keep the trees in shape; this will make them bear more quickly. Hard pruning means more growth and less fruit. When the trees are bearing, prune each tree the way you find you can get the best results. Cleopatras are subject to bitter pit, and very little pruning is necessary. Top the trees as little as possible, for with topping and heavy pruning there is always a danger of the fruit becoming affected with bitter pit. If the branches become too long they can be cut back to the main arm, and so assist the limbs in making a stout development, capable of bearing a good crop. Dunn's Seedling (or Munro's Favorite) should be well pruned in the centre and the top well cut back, for this variety has a tendency to make straight growth. The trees bear a large crop in alternate years, and for that reason should be pruned somewhat heavily to save the limbs from breaking and spoiling the shape of the tree. Rome Beauty is also inclined to make straight growth, and should be opened out in the centre even more than Dunn's Seedling, because the fruit does not ripen till late in the season. The pruning of Jonathan and King David differs somewhat from the other varieties. They need heavier pruning, the trees should be well topped, and the small limbs in the centre of the trees where the fruit buds are some distance apart should be spurred back to 3in. or 4in. in order to force the development of fruit buds. These two kinds are naturally open growing, and do not need much taken out of the centre of the tree. They are also rather small apples, and if not kept well pruned the fruit will be too small for sale, and will be borne on the end of the limbs. Apricots should be pruned soon after the fruit is picked, care being taken not to start too soon, otherwise they will probably make fresh growth, and spoil to a certain extent the forcing of the fruit bud. With summer pruning the top main leader should not be touched, but all water shoots should be removed, and the tree kept well open in the centre. The small limbs should not be pruned, or they will probably die. By pruning in the summer the orchardist is able to proceed with the winter ploughing without any loss of time. All that is necessary in the winter is to top the leaders that are left. Peach trees can be pruned on very much the same line as apricots, only that they should be treated somewhat more heavily. Pears usually make very straight growth, and for that reason it is necessary to keep the centre of the tree well opened out and cut back the long straight shoots. The small limbs in the centre should not be pruned too heavily except when they are too long and when the buds are a long way apart. The Duchess is one of the best varieties of pears for this district, and should only be pruned about every other year. Trees that are sickly and not making much growth should be pruned more heavily than the tree that is making strong growth. See that the secateurs and other tools are sharp and clean, and all cuts made close to the bud which is on the outside. This will induce the tree to make an outward growth, while by cutting close to the bud there will not be so much dead wood to cut out. Spraying as a branch of fruitgrowing is not recognised as it should be. The commercial orchardist knows the important part spraying plays in the ordinary routine of orchard work, but it is the owner of the small orchard who is so often neglectful. He may not dispose of his fruit as a commercial proposition, but merely grows sufficient for home requirements, and for this reason considers spraying is not at all necessary. Spraying, like most other essential things, requires the exercise of a little common sense. For instance, to spray a tree regardless of the main points of a particular disease or pest will probably result in loss of time and money, and the grower will condemn the spray, whereas in reality he is, perhaps, to blame himself. The pests of a fruit tree can be divided into two sections—fungi and insects. A fungus is a form of plant life. One form throws out roots which enter the tissues of the leaves and break down the

cells and utilise the sap, finally throwing out spores, by means of which the fungus is spread and carried on under suitable conditions. It is evident, therefore, that to cope with such a fungoid disease any treatment to be used must be applied before an entrance has been made into the tissues of the plant. The treatment is preventive, not curative. Spraying after the disease shows is no good, because the damage is done. Usually moisture and heat are required for the development of fungoid diseases, and the moisture they require is often their undoing, for at that time the moisture dissolves some of the spray material, and it is in this way that the spores are killed. Bordeaux and Burgundy are well-known remedies. Bordeaux consists of a mixture of bluestone, lime, and water. It is essential to the success of the spray that good quick lime be used; the lime is to prevent the burning of the foliage by the bluestone. In the Burgundy mixture soda is used in place of the lime. A fungicide should be applied in the late autumn, when the leaves have fallen. The wintering or resting spores, which are the reproductive cells of the disease, and then attacked, and for this reason a strong solution should be used. The next spraying should be given when the buds begin to swell, when normal strength material should be used. It may be necessary to spray again when the fruit has formed. Curl leaf of the peach and nectarine, and shot-hole and scab of the apricot, can be treated in the same way. Insects are of two kinds—chewing and sucking. The former eats the leaves, fruit, and shoots, and to effectively deal with them their food must be coated with a poison. Arsenate of lead is the most efficacious spray for the purpose. Codlin moth and cut worms belong to this class. The sucking insect is provided with a pointed hollow trunk, with which it pierces the tissues of the plant, and sucks the sap. Poison for this class of pest is no good; it must be destroyed by a spray or insecticide, which, coming into contact with the insect, burns its body or else covers its airholes and smothers it. Woolly aphid, peach aphid, and red spider come under this heading, and the most effective remedies are kerosene emulsion, red oil, resin wash, and lime sulphur. Codlin Moth.—The damage this insect does is well known to apple and pear growers. It is a chewing insect, and is readily treated by timely applications of arsenate of lead. The first spraying should be done as soon as the petals fall from the flowers, care being taken to see that the calyx end of the forming fruit is well filled with spray. A second spray is necessary a fortnight later, followed by a third as the fruit develops. Peach Aphid.—Spray as soon as you see them with kerosene emulsion or tobacco wash, and repeat the dose in a few days. Woolly Aphid.—The spray for this pest must be driven with force right on to the aphid by holding the nozzle close to the affected parts. The spray must go right through the woolly covering and on to the aphid to be effective. The sprays most effective are black leaf 40 and red oil. Red spider is another pest the orchardist has to fight. It not only attacks apples, but is very fond of prune trees. Red oil sprayed at the rate of 4galls. to 100galls. of water in August before the trees shoot, followed by another spraying with lime sulphur, 1½galls. to 100galls. water, when the trees are in flower or when the spiders are on the move, I find very effective, and keeps the pest well in check. Never spray when the weather is wet or too hot; always choose a cool still day if the best results are desired."

MCLAREN FLAT.

November 22nd.—Present: 60 members.

POULTRY.—The following paper was read by Mr. E. S. Bagshaw:—"I have been breeding Black Orpingtons for eight years, and ask for no better breed of poultry. They are hardy, and great foragers, and do as well confined as they do when run at large. They are a dual purpose fowl. After the second year they are worth 5s. per head for table purposes. When hatching and rearing, they are easy to handle, and a ready market is found for the cockerels. They come in to lay at five months to six months of age, if properly fed. I have had the one strain for eight years, and always go back to the man I first bought from for a fresh cockerel or hen for a change. One can keep breeding from the same pen for years, if eggs are set from different hens. Do not forget to feed the birds well. I hatched 36 pullets last season and they came into laying in March and April, and from the end of April I have averaged 28 to 32 eggs a day. I attribute their good laying to time of hatching and to good and regular feeding. My feeding consists of bran and pollard. Twice a week I add crushed

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HOG, DOG, AND LAMB PROOF.

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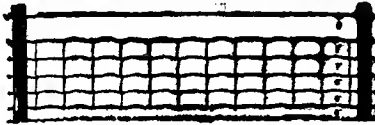


Fig. 7—Cyclone Special Spring Coil Sheep Fence.

The fence illustrated is the famous Cyclone Spring Coil Special Sheep Fence, 5 lines, 26 inches high, with barb wire 9 inches above top line wire, making complete fence 42 inches high, and serviceable for all stock.

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GENERAL MANAGER: F. W. STRACK, F.A.I.S., F.C.I.S. (Eng.).

charcoal to the morning mash; mudday I throw in half a handful of wheat per hen, and at night time another feed of wheat. Another strong point in their favor is that when hatched in August, the pullets do not moult. One more factor in their favor is the color of the egg. If used for export, the brown egg is preferred. The ideal mating is a 10 months' to 12 months' old cockerel, mated to second season hens. If the hens are medium sized, use a cockerel a little larger. Be sure that the hens are fine boned and sleek in the head. Anything coarse and heavy will give very sluggish progeny. The same applies to the cockerel. One of the most important things in breeding poultry is the size of the egg. This year every egg I hatched weighed 2½ozs. or more. When I finish breeding I lock up the cockerels, so that all the eggs will be infertile. An infertile egg will keep for months, whereas a fertile egg will soon go stale. With good feeding and housing a flock of fowls should average 200 eggs per bird. I use incubators and any hen I can obtain for hatching. Do not feed the chickens until they are at least 48 hours old, and then only give them a little at a time. Always have gravel, shell grit, and finely ground charcoal on the floor of the brooder. Care must be taken to have shallow tins for drinking, otherwise some of the chicks will be drowned. Always round off the corners of the brooder, otherwise the chickens are apt to suffocate one another. Provide plenty of green feed. Three times a week I clean out the run, and each time cover the bottom with an inch of turf covered with natural grass."

THE CULTIVATION OF CURRANTS.—The following paper was read by Mr. F. B. Wilson:—"Currants are a product in which we are all interested, and form part of an important industry. It is, therefore, imperative that we should produce the very best article, which is so essential, if we are to compete successfully against the older countries of the world, where labor and living conditions are so much lower than they are in Australia. It is very necessary to produce a sample of rich, dark color, carrying all the bloom that it is possible to retain in the drying process, and to be even in size. It is impossible to secure a sample showing an attractive bloom off trays or out of a drying shed that has been filled with inferior or immature fruit, such as is usually gathered from badly, and, at times, uncultivated, vineyards. I do not say that it is always the cultivation that is responsible for poor and faulty fruit. There are times, and I am sorry to say they frequently occur, when bad pruning, performed by unskilled and inexperienced men, is to blame. This point cannot be too carefully observed. There is nothing that gives more trouble than a rough and dirty pruner. Summer pruning proves very beneficial both to the vines and the quality of the fruit at vintage time. It is necessary to manure the vines in order to obtain the best results. Different soils require different fertilisers. My experience in heavy land leads me to believe that in this class of soil we require something to keep the heavy clay soil loose, and I recommend a dressing of 1 ton of gypsum to the acre. I have found this is very beneficial; it renders the land easy to work, and assists the soil to retain moisture during the summer, which is so essential for developing and maturing the crop. This manure in itself is not sufficient. My experience has been that 4cwts. of bonedust to the acre every four years, and 4cwts. vine manure annually, with a dressing of gypsum every third year, has given really good results, and I have been able to produce samples that are very satisfactory from this method of fertilising. However, the determination of the best fertiliser to use is a question for the vigneron to decide. I am sure that the class of land above referred to requires something to cause it to relax, and it may possibly be a great benefit to dress with 1 ton per acre of gypsum alternate years, as well as the 4cwts. vine manure annually. The question of cost will naturally arise, and I admit that at first glance it appears to be high. Gypsum at £3 per ton represents a cost of 30s. per acre annually, and vine manure at £8 per ton, 32s. per acre plus carriage; 4cwts. bonedust every four years works out at 8s. per acre annually, making a total of £3 10s. per acre, plus carriage. This works out approximately at 10s. per ton, and adds to the above cost per acre accordingly. When, however, this is compared with the returns of a vineyard that has not been properly treated, it will be agreed that it pays to fertilise. On the one hand you obtain a return of about ½ a ton, and perhaps less, to the acre of poor-quality fruit, altogether unfit for export, a disgrace to the district in which it is grown, and bearing no recommendation to the grower; on the other hand you have a return of 1 ton and often 1½ tons to the acre of beautiful and fully matured fruit that is carrying that rich, glossy bloom which is required to enable

it to compete in the world's markets, and make the industry a success, both to the grower and the State. Viewing the facts in this light, you will easily see that it is a very profitable undertaking to manure judiciously. The cost per acre set out at £3 10s. for manure, plus carriage 10s. The value of $\frac{1}{2}$ ton of fruit per acre, no manure, the currants valued at 4d. per lb. (approximately) off the trays through the buck sieve, £18 13s. 4d.; as against 1 ton off trays per acre at 4d. (approximately), equals £37 6s. 8d., showing a difference of £18 13s. 4d. per acre, less cost of manure, £4, leaving a profit per acre of £14 13s. 4d. These figures are based on conservative lines, and do not allow for the possibility of inferior fruit from the unmanured vines. The time has arrived when it is absolutely imperative that we produce an article that will stand the tests that are being made (and rightly so) by the Government of the day. In the past, inferior products have been exported which soon undermined the industry, and to-day it is necessary to export an article that will redeem and uphold Australia's good name. The best results are secured when dressings of manure have been applied after the first ploughing. The heavy winter rains having then passed, the danger of losing the manure by washing is less. Weather conditions are certainly a very great factor in successful cultivation, and if favorable, make the work very much easier. After the first ploughing, the cultivator should be worked to keep the soil loose, and prevent it setting hard. In a wet season, I find it necessary to cultivate twice, and on some parts three times, between the first and second ploughing to keep the land in a fit condition. After the second ploughing, it is very necessary to work the soil to a fine surface, in order to conserve as much moisture as possible. After every summer rain the cultivator should be at work; in fact, there is always a job that will pay the grower—keep the cultivator continuously working. On a 40-acre holding this implement should never be idle during November and December. The grower that follows his cultivation on these lines will be amply repaid, and at vintage will have, under normal conditions, a sample of fruit of the first quality. On the other hand, the grower that does not attend to cultivation must be prepared to accept at least a one-crown drop on his fruit, which means at least 1d. per lb. This in itself represents a very substantial loss. On many occasions after the first ploughing the soil is allowed to harden without even being worked with the harrows to crumble the surface. This, in my opinion, is very disastrous to the cultivation of a vineyard. It is most essential to retain moisture in the viticulture industry, and if the land is left in its rough state after the first ploughing, and the season happens to come in dry, the so-much-coveted moisture soon disappears, and leaves the soil rough and hard. To overcome this trouble the cultivator should be brought into use after the harrows have crumbled the surface. If this is practised it will be found that when the second ploughing is started, the soil will turn up in a soft and loamy condition, which is very necessary if the moisture is to be retained. In a country like Australia, with the excellent conditions which we enjoy, it does not seem just that the people that help to produce the article should have to pay more than the price paid by people on the other side of the world. If our organisations can and do sell overseas at a price within the limits of the consumers' capacity to pay, then why should not the people of Australia be able to purchase their own grown products at the same price? This, I contend, has been one of the principal reasons that our consumption of fruit per head of the population of Australia has been so much lower than that of the Americans. Further, it should be the aim of the grower to supply the best-quality fruit for home markets as well as for export. It is a mistake to dump inferior fruit on the markets for home consumption. The fruit should be of excellent quality, and at the world's parity price, so that Australians could be encouraged to eat more fruit and help the fruit industry."

RAPID BAY.

November 10th.—Present: 17 members.

HAY AND HAY MAKING.—The following paper was read by the Hon. Secretary Mr. A. J. Grundy):—"No hard and fast rule can be laid down as to the varieties which should be grown for hay, because some wheats which have proved a success in one district are not profitable in others. I have tried a fair number of varieties,

and for this district I recommend King's Early and Crossbred No. 53 (which is also known as Zealand Blue), because under ordinary conditions a profitable harvest is assured, and stock are very fond of the hay, and if fed to them long they will consume almost every straw, and keep in good condition. The grain should be pickled in a solution of 1lb. bluestone to 10galls. of water a few days prior to sowing, as a preventive of smut and other fungus diseases, and should be sown on fallowed ground free from weeds. One and a half bushels of Crossbred should be sown to the acre, but as King's Early is not a good stooling wheat 2bush. to the acre are required to ensure a thick crop. I also advise growers to use one bag of superphosphate to the acre, because the heavier dressing of manures gives the best results. The crop should be rolled when the wheat is about 5in. or 6in. in height, in order to prepare a smooth surface for the binder, and enable the crop to be cut closer to the ground. The best time to cut hay for marketing purposes is about 10 days after the plants have flowered or when the grain is in the milky stage. This will assure a good color, which is most essential from a marketing standpoint. If, however, the hay is to be used for feeding on the farm, and a little grain is desired, the crop should not be cut until the grain in the head of the wheat can be felt to be 'firming off' when pressed between the thumb and finger. Oats grown for hay should not be cut until the heads are turning a golden color or when the grain is beginning to firm. It is a great mistake to cut oats too green, because they are inclined to be bitter, and stock did not care for them. The sheaves should be of medium size, and well tied to save waste in handling, and should be left lying in the sun one day before stooking, to obtain a nice green color and a sweet hay. To leave the hay for three or four days before stooking is a worse mistake than stooking close up to the binder, because if the sheaves are left lying about for any considerable time they become dry and brittle, and will not make good chaff. Round stooks should be made, consisting of between 30 sheaves to 40 sheaves, placed in an upright position, and if the stooking is properly done it is surprising what a lot of rain it will take to damage the hay. The hay should be fit to cart about a fortnight after cutting, but this, of course, depends largely on weather conditions. A good test is to take a sheaf from the centre of the stook and try to break it at the top joint, and if it breaks cleanly the hay is ready to go into the stack. A good bed of straw or timber should be placed as a foundation for the stack, otherwise the bottom rows of hay will become musty and unfit for use. In building the stack the best way to place the sheaves is butts upwards, to prevent the stack from shifting. This, of course, only applies to the building so far as the set off for the roof is concerned, and from there onwards I favor placing the heads out, in order to turn off the rain. The middle of the stack should be kept well filled from the start, and when the eaves of the stack are made, the sheaves should be placed 5in. or 6in. further out than the other sheaves, in order to carry the water clear of the stack. When the eaves are made the middle of the stack should be filled 3ft. higher than the outside of the stack, until the stack is nearing completion, to prevent rain from getting into the middle of the stack. After the stack is completed, it is advisable to cover it as quickly and as thoroughly as possible. Some farmers make a practice of covering it with loose straw, but I favor thatching, because the extra expense is small, and less straw is required than if put on loose, and mice do less damage under thatch than under loose straw."

STRATHALBYN (Average annual rainfall, 19.28in.).

October 23rd.—Present: 20 members.

CALVING DIFFICULTIES.—In the course of an address, "Troubles of the Cow in Calving," Mr. T. Collett explained at length the irregular positions in which the calf was sometimes presented. When such a mal-presentation occurred, the calf was seldom delivered without assistance. An iron hook could sometimes be used to place the calf in the normal position for delivery. As a last resource, it was often necessary to remove the calf in pieces, care being taken to prevent any unnecessary cutting. Mr. W. J. Springbett said if assistance were rendered to the cow, a gentle yet firm downward pull should be exerted on the calf.

SHOAL BAY.

November 20th.—Present: 14 members and visitors.

FALLOWING.—Mr. C. Hall, who read a short paper dealing with this subject, expressed the opinion that every farmer should endeavor to put as large an area as possible under fallow, especially if there were indications of the season being a dry one. The work should be commenced early in the season to cause a good germination of weeds, which could be turned under before harvest. He favored working the land twice to a depth of 3 in., and advised running sheep on the land to kill the weeds and improve the condition of the soil.

ALDINGA, November 28th.—The business for the evening was a paper contributed by Mr. M. Stone on the subject, "Poultry Keeping." A keen discussion followed the reading of the paper.

BALHANNAH, July 7th.—Mr. W. Rollbuseh read a paper, "Herbs—Their Uses and Commercial Value," and an interesting discussion followed. Forty-three members were present at a further meeting held on August 24th, which took the form of a Question Box, when several subjects of local interest were brought forward for discussion.

BALHANNAH, November 20th.—A paper, "Herd Testing," was read by Mr. F. O. H. Martin, and an interesting discussion followed.

BLACKHEATH, November 23rd.—Mr. E. T. Pym read a paper from the *Journal of Agriculture*, "Tillage of the Soil." Several matters of local interest were brought forward, and an interesting discussion followed.

BLACKWOOD, November 19th.—Mr. W. A. Hamilton, M.P., attended the meeting, and delivered an address, in which he dealt with the advantages to be obtained from the applications of lime to orchard lands. The subject, "Spraying for Codlin Moth," was also discussed.

CHERRY GARDENS, November 30th.—Captain S. A. White, C.M.B.O.U., Vice-Chairman of the Advisory Board of Agriculture, attended the meeting, and delivered an address illustrated with lantern views, "The Economic Importance of Our Native Birds."

LENSWOOD AND FOREST RANGE, November 12th.—The monthly meeting took the form of a Question Box, when several subjects of local interest were brought forward, and an interesting discussion ensued.

MACGILLIVRAY, November 9th.—The monthly meeting of the Branch was held at Mr. R. Wheaton's homestead. A tour of inspection was made of the crops, stock, and farm buildings, after which the visitors were entertained at afternoon tea by Mrs. Wheaton.

MEADOWS, September 26th.—Mr. G. Connor, of the Kangarilla Branch, attended the meeting and read a paper, "Top-dressing Pastures." A further meeting of the Branch was held on October 24th, when the Government Poultry Expert (Mr. D. F. Laurie) was present and delivered an address, "Egg Production."

MORPHETT VALE, November 22nd.—A homestead meeting was held on the above date at Messrs. Hunt Brothers' residence. A large number of members and visitors attended, and an interesting and instructive afternoon was spent in inspecting the working plant and crops. Afternoon tea was provided by Mesdames F., H., and E. Hunt.

MOUNT BARKER, November 21st.—Mr. S. Duffield delivered an address, "Experiences with the Divining Rod," to an audience of 39 members and four visitors.

MOUNT PLEASANT, November 9th.—Mr. C. O. Royal read a paper from *The Journal of Agriculture*, and an interesting discussion followed. A short talk followed, in which members dealt with the subject of wheat pickling. Mr. W. Nigam expressed the opinion that pickling on the floor was the best method to ensure a clean crop.

TWEEDVALE, November 28th.—The Orchard Instructor and Inspector for the Hills District (Mr. E. Leishmann) attended the meeting and delivered an address, "Diseases of Fruit Trees," to a gathering of nine members and nine visitors.

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

November 23rd.—Present: seven members.

FENCING.—Mr. W. M. Laslett read the following paper on this subject:—It is my intention to describe what, in my opinion, is the most economical fence, and, secondly, fences that will answer a dual purpose, such as sheep and vermin proof, and cattle and sheep proof. The style of fence I recommend is one 3ft. 7in. high, with three posts 5ft. 4in. long, and two droppers between each post, to the chain. The cost of droppers and posts per chain is about 4s., and that of the netting, the wire, and No. 10 wire for tying the barb wire to the posts and droppers about 12s. per chain; three plain No. 8 galvanized wires and one 12-gauge barb, about 4s. 6d. per chain. This makes the total cost of material including strainers and stays, about 21s. per chain. It is necessary to peg the line first, and in doing so it is a great advantage to have a set of pegs of the same width painted white, near the top. Line the pegs from end to end, i.e., first place the two end pegs in position, and then place the other pegs in line. If it is possible to plough the trench for the netting do so, because this will save a good deal of labor, both in taking out and filling in the trench. Endeavor to erect the posts as the holes are sunk. A guide to the height of the fence can be made by marking the rammer 3ft. 7in. from the ground. To give the fence a neat appearance on the top it might be necessary to raise or drop a post an inch or two, according to the contour of the ground. When the posts are in position, and the strainers are erected about 6 chains apart and about 3in. higher out of the ground than the ordinary posts, boring is the next operation. A good boring gauge is one made of a piece of hop iron bent to hang level on the top of the posts, with notches cut indicating where the holes are to be bored. The posts should be bored with a $\frac{3}{4}$ in. bit, and the droppers with a $\frac{3}{4}$ in. bit. The position of the wires should be:—Barb on top of posts, and droppers fastened with No. 10 wire, plain wire 7in. from top, netting wire 12in. from top, thus allowing the netting to go 5in. into the ground, belly wire 28in. from the top. In staying strainers where permanent stays are required, mortise a hole in the strainer about midway between the netting and belly wires. Place the stay in position, and at the other end put in an ordinary post. First strain tightly through the hole for the netting wire in the ordinary post. First strain and fasten the barb wire to the posts and droppers, and the plain wire nearest to the next, then two wires will keep the droppers in position. In straining wire, do not turn it short around the post, but give it another notch or so on the machine, and allow it to find its own turn when the plug is removed. When the netting is being rolled out, always start from the end that allows the operator to keep his left hand to the fence, and when about half a coil has been run out the slack can be pulled in with the hands and again at the end. Drop the next coil on the netting to hold the strain whilst fastening the wire. First tie the netting around the posts, then make three ties on the top wire and two on the belly wire between each panel. Fill in the trench, and the fence is completed. For cattle and sheep a very effective fence is one 3ft. 8in. high, composed of two barb and four plain wires, and at least six posts to the chain. Droppers can be used if preferred, but if used I recommend clinching to the wires with No. 10 wire to keep the wires strained tightly. The gauge of the fence is 3ft. 8in. high, barb wire on top tied with No. 10 wire, plain wire 9in. from the top barb, belly wire 7in. from the top and pulled through the posts, plain wire 25in. from the top, next wire 31in., and another 37in. from the top, leaving the bottom wire 7in. from the ground, making the space between each wire from the top to the bottom as follows:—9in., 8in., 8in., 6in., 6in., and 7in. between the bottom wire and the ground. To enable the barb wire to be pulled through the post it is necessary to bore the holes with a $1\frac{1}{2}$ in. or $1\frac{3}{4}$ in. bit, and then run a plain wire through the hole. Run out the barb wire along the next strain, and tie a piece of wood (not too heavy) to the end to keep it from coiling up, and attach the barb to the plug wire with a knot that will easily pull through the holes. Fasten the other end to the axle of the cart or to a swingletree, and drive the horse along, when the barb will follow through the holes. Any ordinary light horse will pull through six or even 10 chains of wire without any trouble, but I advise straining most of the other wires before pulling in the barb, taking care to strain and tie the top barb to keep the posts in position. This type of fence will keep all classes of stock securely enclosed.

KALANGADOO WOMEN'S (Average annual rainfall, 33in. to 34in.).

November 10th.—Present: 10 members and one visitor.

Mrs. Campbell contributed a paper on the care and feeding of cows and calves, which was followed by a good discussion. The question arose, "Should the newly born calf be taken away from its mother, or left with her for three or four days?" Some members favored the latter practice, whilst others were of the opinion that the cow and calf fretted more, and it did them more harm than if they were separated the first day.

MILLICENT (Average annual rainfall, 29.25in.).

November 3rd.—Present: 14 members and seven visitors.

TOP DRESSING PASTURES.—In the course of an address dealing with this subject, Mr. S. R. Cockburn said that constant grazing had considerably reduced the original carrying capacity of pastures. Every pound of wool, beef, or mutton and every gallon of milk sent away from the holdings had robbed the soil of plant food. It had been conclusively proved that top dressing with phosphatic manures at once put phosphates into the soil, and, by fostering the growth of clovers and trefoils, which were nitrogen gatherers, the soil was enriched with nitrogen. Superphosphates would give bigger results on grass land than on a wheat crop. If the soil required lime it should be supplied separately, but to apply lime alone on light lands was extremely undesirable, because it exploited the limited fertility they contained. Four or five weeks after applying the lime, the land should be top dressed with super. Phosphates would destroy onion weed, and eliminate bracken, because the clovers and trefoils came on so freely that these pernicious weeds were crowded out. Phosphates would not wash out of the soil, either in floods or seepage water. Except in localities where water was likely to remain stagnant in the winter, autumn applications of super usually paid best. The fertiliser thus applied brought on the pastures perhaps weeks earlier after the first rains, and the winter growth was not only more generous, but more nourishing. The spring growth was also earlier, and the growing period extended long into the summer. The method of application in general was by means of the ordinary seed drill. The tyres were left down where the soil was friable, and lifted where the surface was hard and rough. If no drill was available, or the land too rough for drilling, results equally as good could be obtained from broadcasting the super by hand. There were several machines on the market made specially for top dressing, the cost being about £30. Where cattle droppings liberally dotted the paddock, the land should always be harrowed before or immediately after top dressing, in order to break up and distribute the animal manure, and spread the grass seed incorporated in the droppings. In starting the system in a fresh paddock, it would be advisable to use 2cwt. per acre. After the first application the allowance might be reduced, and the frequency of the application would be determined by the revenue derived from the land. Stock might be safely left in the paddock whilst it was being dressed, but, if convenient, it was better to close the paddock to stock for a time, in order to allow the clover and grasses to become more firmly established. Mr. J. W. Williams said most farmers found weak patches in their crops, when the growth had turned to yellow. In such cases sulphate of ammonia was an effective remedy. He asked if the same results would be obtained by dressing the yellow patches with super. Mr. Cockburn said sulphate would restore the color, but it would not pay to use it on grass lands. It was phosphoric acid that the soils in South Australia lacked. Mr. H. F. L. Holzgrefe said he had been using super on grass land at Blue Gum Park for the past two years, and the results were undoubtedly encouraging. His paddocks, however, were thoroughly clean, and had been sown with grass seed. Regarding the results of super dressings on sandy land, excellent results were being obtained by an enterprising farmer on land at the foot of the Mount Muirhead Range. Mr. R. Varcoe said super had been used on land at Colaba with no apparent result. The lecturer suggested that stock had eaten the increased growth as it came on, and advised Mr. Varcoe to watch his stock. He would find that they spent most of their time on the dressed portion of the paddock. Mr. J. W. Williams said he had seen at Mount Graham conclusive proof of the value of super on grazing land. It should be remembered, however, that a spending 5s. per acre on super each year, land purchased at £5 per acre would cost the owner £7 10s. per acre at the end of 10 years. With wool, meat,

